

Coordinate Measuring Machine Probe Accessories



A wide range of probes supports various kinds of measurement applications

Probes for Coordinate Measuring Machines (CMMs)

Scanning Probes



MPP-310Q

Ultra High-accuracy
Scanning Probe

Pages > **4 – 5**



SP80

High-accuracy Scanning Probe
Can Use Long Styli

Pages > **6 – 7**



SP25M

Compact High-accuracy
Scanning Probe

Pages > **8 – 9**



SP600Q

High-accuracy
Scanning Probe

Pages > **10 – 11**

Non-contact Probes



SurfaceMeasure

Non-contact
Line Laser Probe

Pages > **12 – 13**



QVP

Quick Vision
Probe

Pages > **14 – 15**



CF20

Centering Microscope for
CMMs

Pages > **16 – 17**



SURFTEST PROBE

Surface Roughness
Probe

Pages > **18 – 19**

Special-purpose Probe

Touch-trigger Probes



TP7M

High-accuracy
Touch-trigger Probe

Pages > **20 – 21**



TP200

Compact High-accuracy
Touch-trigger Probe

Pages > **22 – 23**



TP20

Compact
Touch-trigger Probe

Pages > **24 – 25**



MH20i

Touch-trigger Probe with
Manual Probe Head

Pages > **26 – 27**

Probe Heads



Application of the Touch-trigger Probe

PH10M/PH10MQ

Motorized Probe Head

Pages > 28 – 29



PH6M

Fixed Probe Head

Pages > 30



Application of the Touch-trigger Probe

PH1

Manual Probe Head

Pages > 31

5-axis Control System Probes



REVO-2

High-speed 5-axis Control Scanning Head

Pages > 32



PH20

5-axis Control Touch-trigger System

Pages > 33

Probe Changer

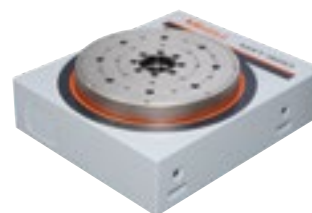


ACR3

Automatic Probe Changer

Pages > 34

Rotary Tables for CNC CMM



MRT240/MRT320/QS600/800

Rotary Table

Pages > 35

Quick Guide to Styli	36
Product Identification on Styli for CMMs	38
Various Styli	39
Attachment Tools	58
Stylus Set	59
Stylus Cleaner	60
Ceramic Master Ball	62
Joystick Box, Safety Laser Scanner	63

MPP-310Q Ultra High-accuracy Scanning Probe



Fast scanning

The **MPP-310Q** is a multi-functional probe designed for CNC CMMs. It can not only perform a continuous path contact-type scanning measurement [a measurement method that implements a collection of a large amount of coordinate data while traveling along a continuous path in contact with the workpiece] at V2 $\leq 0.3 \mu\text{m}$ (reference value when the LEGEX series is installed), but also high-accuracy point measurement of $\leq 0.1 \mu\text{m}$ (on the LEGEX CMM series), and data collection from a centering point measurement.

Omni-directional scanning

The **MPP-310Q** has internal high-accuracy scales with a minimum resolution of $0.01 \mu\text{m}$ for each direction (X, Y, and Z axes), which makes it possible to read the stylus displacement in any direction.

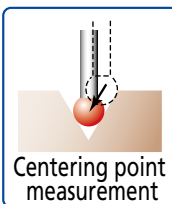
The air bearing employed in the sliding section of each axis helps enable this probe with minimum directionality.

Low measuring force

The ordinary touch-trigger probe, even if it needs only a small force to generate a trigger signal the moment the stylus actually comes into contact with the workpiece, may apply several tens to several hundred grams of force in the over-travel period that immediately follows contact. In addition, some scanning probes from other manufacturers employ such a structure that the motor drive mechanism forcibly determines the probing position in order to permit the use of a longer stylus, necessitating the probe to actually produce a greater measuring force. In contrast, the **MPP-310Q** can reduce its measuring force to a minimum of 0.03 N so that it can even measure elastic workpieces such as resins, etc., without damaging them at all.

Fast scanning

For a scanning measurement, either of the following scanning methods can be selected: one in which scanning progresses while automatically following an unknown geometry (unknown geometry scanning), or one in which scanning progresses based on the locus of the probe tip given beforehand (known geometry scanning). With known geometry scanning it is possible to perform fast scanning at 120 mm/s . Conventionally, it is normal to evaluate geometries such as a line or a circle through point measurement. However, for evaluating the flatness or roundness of an extra precision-machined workpiece, it is better to improve the reliability of the measurement result by evaluating the object at more measurement points.



Centering point measurement

Naturally, it takes an extended amount of time for a touch-trigger probe to measure such an object point by point if many points are involved. In contrast, the **MPP-310Q** can, for example, complete a measurement in just a few seconds even if it is required to measure an inside diameter of 100 mm using 1000 measurement points. In addition, measurement can be pursued effectively while changing the scanning speed, depending on the measurement accuracy required.

Optional units

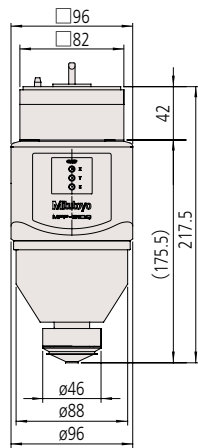
A wide variety of optional units, including rotary table for synchronized scanning and the automatic stylus change system, is available.

MPP-310Q Specifications

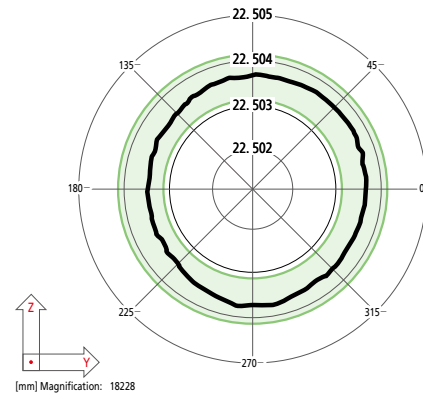
MPP-310Q	Repeatability of point measurement	$\pm 0.5 \mu\text{m}$
	Directions of measurement	$\pm X, \pm Y, \pm Z$
	Measuring power	Approx. 0.2 N/mm
	Clamp function	Independent for each axis
	Stroke	$\pm 1 \text{ mm}$
	Max. stylus length	200 mm^*
	Max. stylus mass	75 g
	Operating temperature	$10^\circ \text{ C to } 30^\circ \text{ C}$
	Air flow rate	$30 \text{ NL/min or less}$
	Supplied air pressure	0.4 MPa
	Stylus attachment method	M4 screw
	Probe securing method	Quill adapter
	Max. allowable spherical scanning shape error $P_{\text{Form.Sph.Scanned.Tact,MPE}}$	Depends on the CMM main unit

* Increase in stylus length or stylus mass may reduce accuracy.

Dimensions



Unit: mm

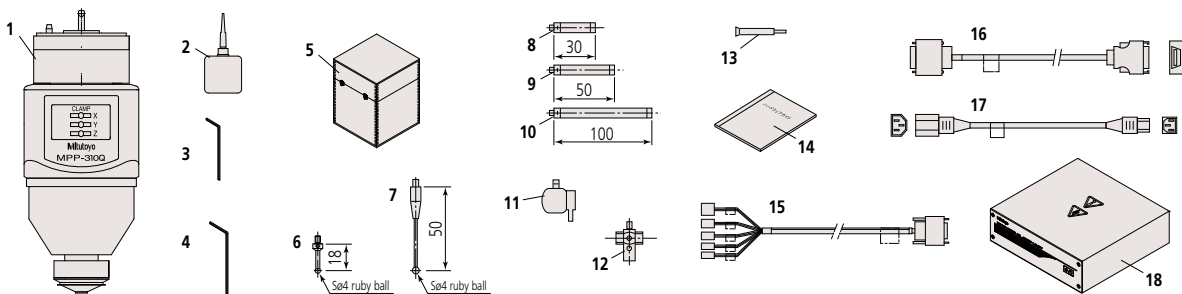


An example scanning measurement of a ring gage with the **LEGEX Takumi model and MPP-310Q**

Set configuration

Unit	Ref. No.	Description	Qty	Remarks
MPP-310Q (N) Probe set	1	MPP-310Q probe main unit	1	Including one stylus mount assembly
	2	Damping oil	1	Silicon oil (2000CS)
	3	Allen wrench / GXL-20	1	
	4	Allen wrench / GXL-30	1	
	5	Storage box	1	Wooden box for storing MPP-310Q
	6	MS4-4R13.5-S	1	
	7	MS4-4R33-S	5	
	8	MS4-EXT30C	2	M4-M4 ceramics Extension L=30 mm
	9	MS4-EXT50C	1	M4-M4 ceramics Extension L=50 mm
	10	MS4-EXT100C	1	M4-M4 ceramics Extension L=100 mm
	11	MS4-stylus knuckle	1	
	12	MS4-stylus center	1	
	13	Stylus tool	2	For attaching/detaching M4 stylus
	14	MPP-310Q Hardware Guide	1	English
	15	EXT CONTOUR cable A	1	
	16	EXT CONTOUR short cable	1	
	17	AC cable	1	For overseas specification
Clamp set	18	MPP-310Q Clamp unit	1	Desktop unit (Varies depending on the CMM main unit.)

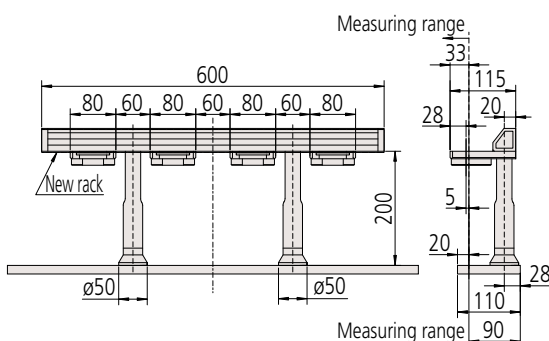
Note: Some items cannot be ordered separately.



Optional units Automatic Stylus Changer

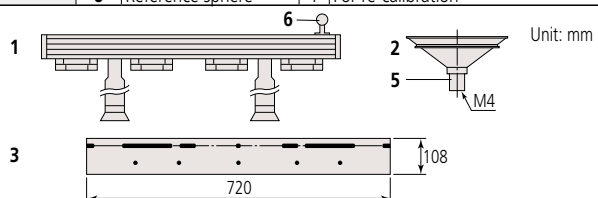
Dimensions

Unit: mm



Detail

Unit	Ref. No.	Description	Qty	Remarks
Automatic stylus change system	1	Auto-stylus change rack	1	Supplied with 4 ports for replacement.
	2	Stylus mount assembly	3	
	3	Auxiliary plate	1	Used for installing a rack on the CMM base.
	4	MS4-4R13.5-S	3	
	5	MS4-stylus center	3	
	6	Reference sphere	1	For re-calibration



SP80 High-accuracy Scanning Probe with Long Stylus Carrying Capacity

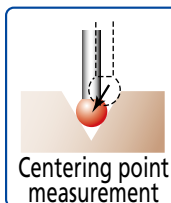


High accuracy achieved even with long styli

The **SP80** scanning probe is designed to achieve high measurement accuracy even when using styli up to 500 mm (in both the horizontal and vertical directions) in length. It is a multi-function probe for CNC CMMs that undertakes not only scanning measurement (a measurement method that collects a large amount of coordinate data while traveling along a path in contact with the workpiece) but also high-accuracy point measurement as well as data collection from a centering point measurement.

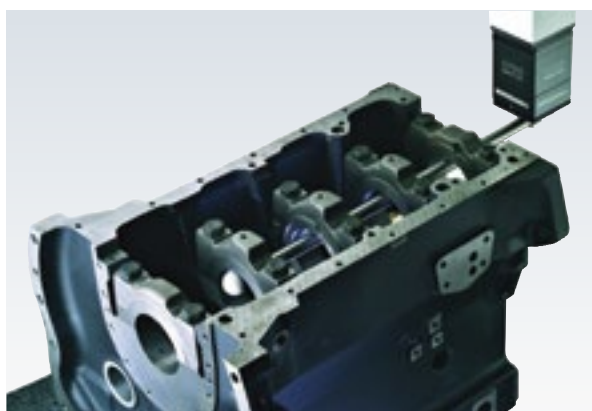
Fast scanning

For scanning measurement, either of the following scanning methods can be selected: one in which scanning progresses while automatically following an unknown geometry (unknown geometry scanning), or one in which scanning progresses based on the locus of the probe tip given beforehand (known geometry scanning). With known geometry scanning it is possible to perform fast scanning at 120 mm/s. Conventionally, it is normal to evaluate geometries such as a line or circle through point measurement. However, for evaluating the flatness or roundness of an extra precision-machined workpiece, it is better to improve the reliability of the measurement result by evaluating the object at more measurement points. Naturally, it takes an extended amount of time for a touch-trigger probe to measure such an object point by point. In contrast, the **SP80** can, for example, complete a measurement in just a few seconds, even if it is required to measure an inside diameter of 100 mm using 1000 measurement points. In addition, any measurement can be pursued effectively while changing the scanning speed, depending on the measurement accuracy required.



Optional units

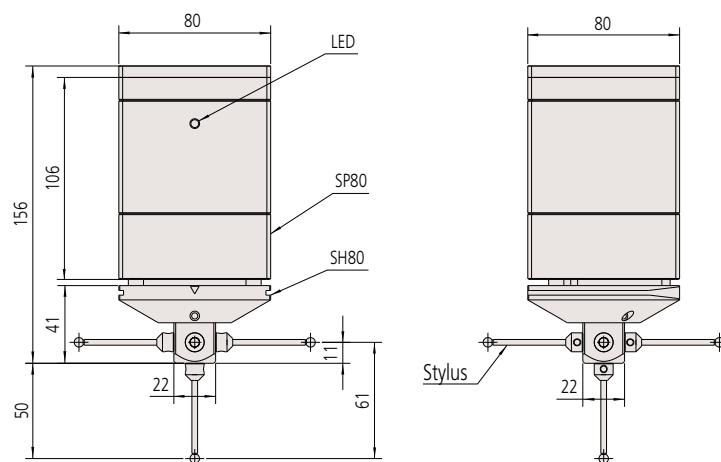
A wide variety of optional units, including rotary table MRT320 for synchronized scanning and the automatic stylus change system, is available.



SP80 Specifications

SP80	Resolution	0.02 μm
	Spring rate	1.8 N/mm (X, Y, Z)
	Mass	Main unit: 860 g
		Stylus holder: 185 g
	Stylus	M5 type; mounting is possible in 5 directions on SH80
	Change rack	Automatic replacement of SH80 by SCP80 is possible
	Longest attachable stylus	500 mm
	Max. stylus mass	500 g
	Accuracy specifications when SP80 is installed	Depends on the CMM main unit
	Operating temperature range	+15° C to +30° C
	Humidity	Max. 80%
	Altitude	Max. 2000 m
	Max. allowable spherical scanning shape error ^P	Depends on the CMM main unit
	Form.Sph.Scan:PP:Tact,MPE	

Dimensions



Unit: mm

Set configuration

SP80 main unit

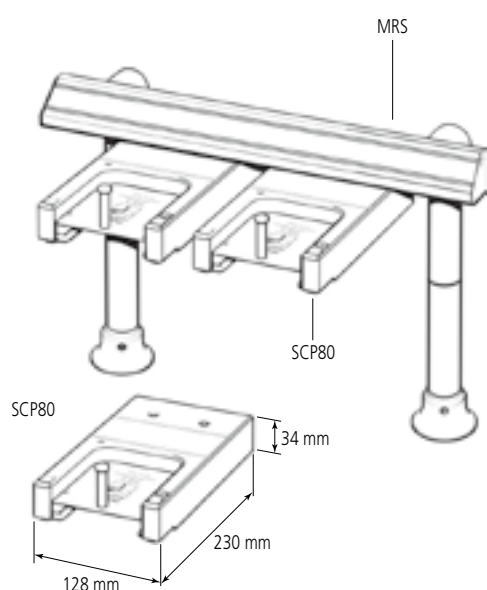
Description	Mass (kg)	Remarks
SP80 Probe kit #1	2.6	One SP80 main unit, SH80, KM80, and $\varnothing 8 \times 60$ mm stylus

SP80 main unit

Product name	Quantity
SP80 Probe	1
SH80	1
Allen key, nominal size 2	1
Allen key, nominal size 2.5	1
M5 -stylus tool	1
S10	1
SH removal tool	1
Stylus ($\varnothing 8 \times L60$)	1

Note: Some items cannot be ordered separately.

Optional units Automatic Stylus Changer



SP80 stylus change set 1 (600 mm-rail specifications)

Description	Unit
MRS kit #2	1
SH80	1
SCP80	2
Rack plate (auxiliary plate)	1
ACR3 attachment screw	1

SP80 stylus change set 2 (1000 mm-rail specifications)

Description	Unit
MRS kit #3	1
SH80	3
SCP80	4
Rack plate (auxiliary plate)	1
ACR3 attachment screw	1

SP25M Compact High-accuracy Scanning Probe



Compact high-accuracy scanning probe

The **SP25M** is a compact high-accuracy scanning probe with an outside diameter of $\phi 25$ mm. This is a multi-functional probe designed for CNC CMMs that can not only perform a continuous path contact-type scanning measurement [a measurement method that implements collection of a large amount of coordinate data while traveling along a continuous path in contact with the workpiece], but also high-accuracy point measurement and data collection from a centering point measurement.

Fast scanning

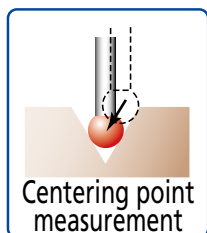
For a scanning measurement either of the following scanning methods can be selected: one in which the scanning progresses while automatically following an unknown geometry (unknown geometry scanning), and one in which scanning progresses based on the locus of the probe tip given beforehand (known geometry scanning). With known geometry scanning it is possible to perform fast scanning at a maximum of 120 mm/s. Conventionally, it is normal to evaluate geometries such as a line or a circle through point measurement. However, for evaluating the flatness or roundness of an extra precision-machined workpiece, it is better to improve the reliability of a measurement result by evaluating the object at more measurement points. Naturally, it takes an extended amount of time for a touch-trigger probe to measure such an object point by point if very many points are involved. In contrast, the **SP25M** can, for example, complete a measurement in just a few seconds even if it is required to measure an inside diameter of 100 mm using 1000 measurement points. In addition, it can pursue any measurement effectively while changing the scanning speed, depending on the measurement accuracy required.

Enhancing the setup and measurement efficiency through automatic change of probe orientations

Since the **SP25M** can be mounted on a probe head such as the **PH10M/PH10MQ** that automatically changes the probe orientation, it can greatly reduce the preparation time for measurement and for actual measurement in comparison to a conventional-type scanning probe whose position is fixed downward. In addition, the use of other probes, as advantaged by the probe change system, makes it possible to realize full automation in measuring various forms of machined parts.

Optional units

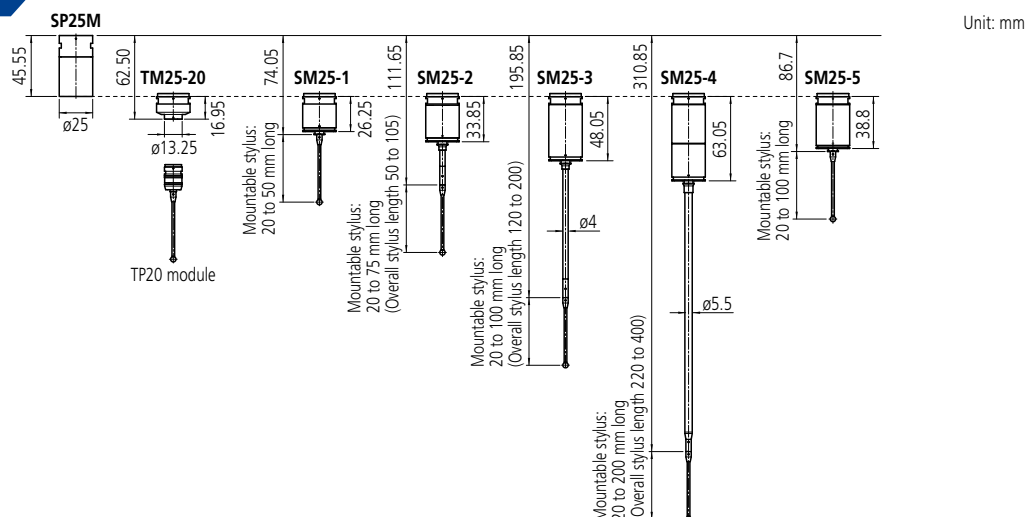
An automatic stylus change system is available.



SP25M Specifications

SP25M	Mounting	Autojoint	
	Stylus	M3	
	Measuring range	± 0.5 mm	
	Overtravel amount	X, Y directions	± 2.0 mm
		Z direction	$+1.7$ mm -1.2 mm
	Spring rate	0.2 N/mm - 0.6 N/mm	
	Max. allowable spherical scanning shape error ^P	Form:Sph.Scan:PP:Tact,MPE	
		Depends on the CMM main unit	

Dimensions



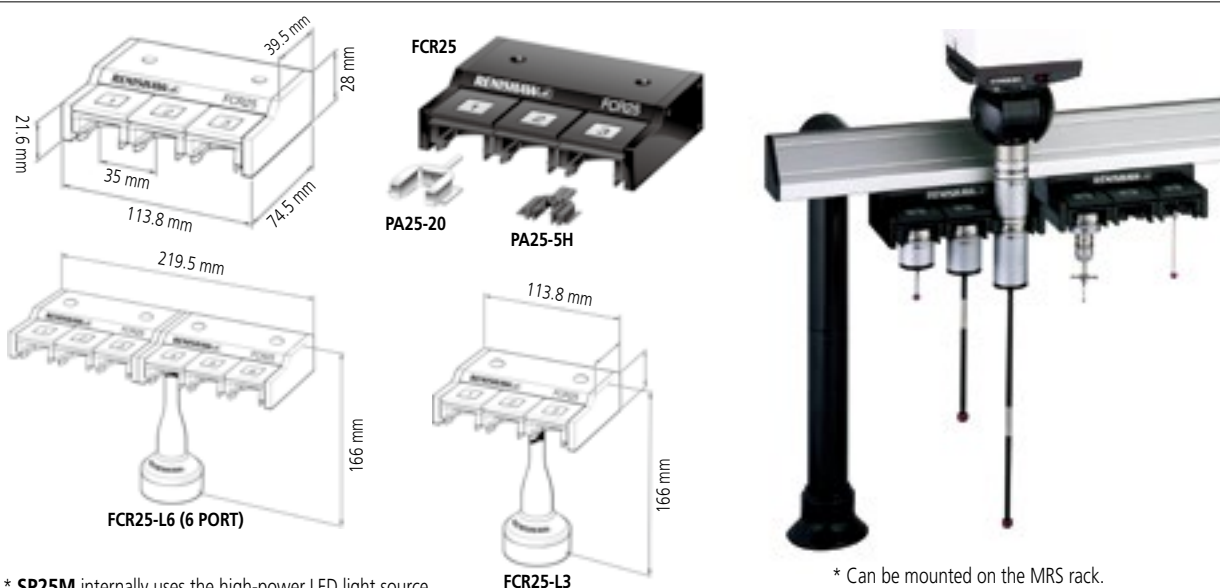
Configuration



Description	Remarks
SP25M full combination kit	A complete set of SP25M, SM25-1/2/3, SH25-1/2/3, and TM25-20
SP25M probe kit #1	A complete set of SP25M, SM25-1, and SH25-1
SP25M probe kit #2	A complete set of SP25M, SM25-2, and SH25-2
SP25M probe kit #3	A complete set of SP25M, SM25-3, and SH25-3
SP25M probe kit #4	A complete set of SP25M, SM25-4, and SH25-4
SP25M probe kit #5	A complete set of SP25M, SM25-5, and SH25-5
SP25M scanning module kit #1	A complete set of SM25-1 and SH25-1
SP25M scanning module kit #2	A complete set of SM25-2 and SH25-2
SP25M scanning module kit #3	A complete set of SM25-3 and SH25-3
SP25M scanning module kit #4	A complete set of SM25-4 and SH25-4
SP25M scanning module kit #5	A complete set of SM25-5 and SH25-5
Stylus holder SH25-1	
Stylus holder SH25-2	
Stylus holder SH25-3	
Stylus holder SH25-4	
Stylus holder SH25-5	
TM25-20 TP20 adapter kit	A set of TP20 standard force module and TM25-20
TM25-20 TP20 adapter	

Note: TTP module (TP20module) will be supported for MCOSMOS V2.4 or later releases.

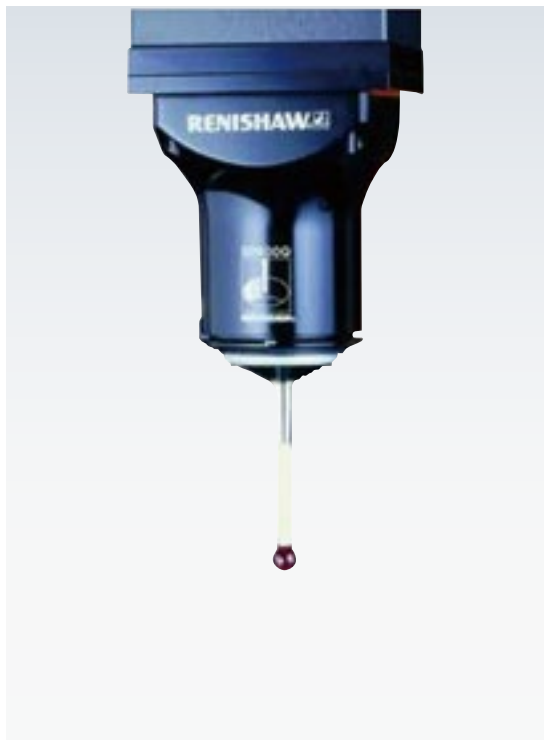
Optional units Auto module changer/Automatic Stylus Changer



* SP25M internally uses the high-power LED light source.
Exercise caution when handling, in accordance with the User's Manual.

* Can be mounted on the MRS rack.

SP600Q High-accuracy Scanning Probe



Compact high-accuracy scanning probe

SP600Q is a high-accuracy scanning probe which can be mounted on the CRSTA-Apex V500 series. It performs not only scanning measurement (measurement method that collects a large amount of coordinate data while traveling along a path in contact with the workpiece), but also high-accuracy point measurement. Direct-mount of this probe on the Z spindle of CRYSTA-Apex V500 allows more effective usage of measurement space.

Fast scanning

For a scanning measurement either of the following scanning methods can be selected: one in which the scanning progresses while automatically following an unknown geometry (unknown geometry scanning), and one in which scanning progresses based on the locus of the probe tip given beforehand (known geometry scanning). With known geometry scanning it is possible to perform fast scanning at a maximum of 120 mm/s. Conventionally, it is normal to evaluate geometries such as a line or a circle through point measurement. However, for evaluating the flatness or roundness of an extra precision-machined workpiece, it is better to improve the reliability of a measurement result by evaluating the object at more measurement points. Naturally, it takes an extended amount of time for a touch-trigger probe to measure such an object point by point if very many points are involved. In contrast, the **SP600Q** can, for example, complete a measurement in just a few seconds even if it is required to measure an inside diameter of 100 mm using 1000 measurement points. In addition, it can pursue any measurement effectively while changing the scanning speed, depending on the measurement accuracy required.

Optional units

An automatic stylus change system is available.

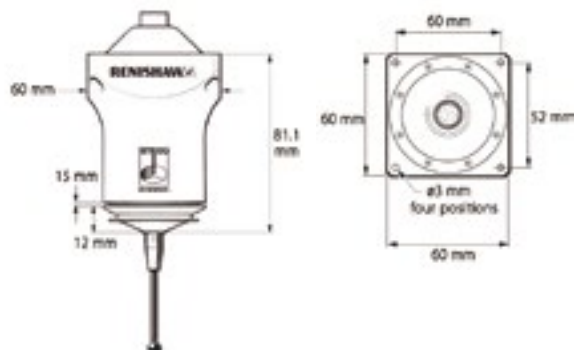


SP600Q Specifications

SP600Q	Measuring range	±1 mm (X,Y,Z)
	Min. reference displacement	0.15 mm
	Spring rate	1.2 N/mm
	Measuring force	0.17~1.18 N (18~120 gf) Varies depending on the probe displacement.
	Max. stylus mass	Max. 20 g *
	Max. stylus length	Max. 200 mm *
	Stylus mount	M4 thread
	Probe head	Unnecessary
	Max. allowable spherical scanning shape error ^P Form.Sph.Scan:PP:Tact,MPE	Depends on the CMM main unit

* Increase in stylus length or stylus mass may reduce the accuracy.

Dimensions

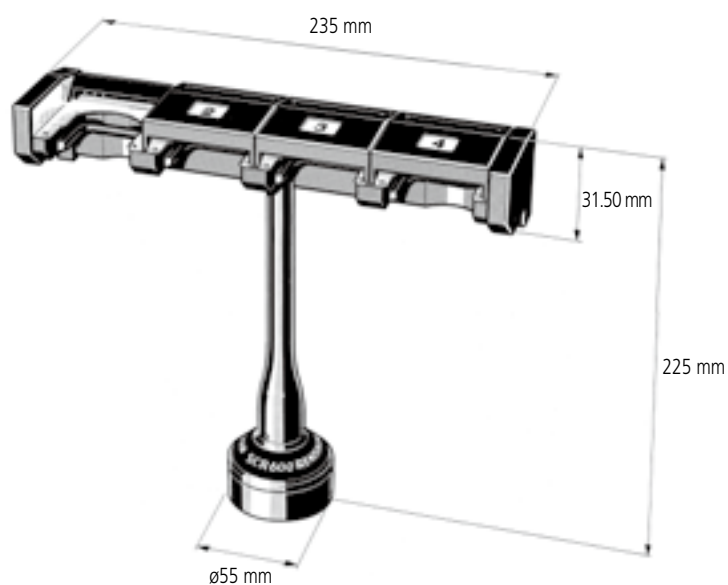


Set (No. 06ADV933) configuration

For CRYSTA-Apex V series

Description	Part No.	Qty
SP600Q Probe kit	06ADV597	1
Spacer A for SP600Q	06ADU577	1
Spacer B for SP600Q	06ADU578	1
SP600Q Head cable	06ADU687	1
SP600 IF cable	06AAS624A	1
ø4L50 stylus (MS4-4R33C)	06ABQ149	1
L50 Extension (MS4-EXT50C)	06ABN849	1
Stylus center (MS4-stylus center)	06ABN857	1
Knuckle joint (MS4-stylus knuckle)	06AAD460	1
SP600Q User's Manual	99MCA562A	1

Optional units Stylus Changer SCR600



SurfaceMeasure Non-contact Line Laser Probe



Benefit of non-contact

As a non-contact probe, it is capable of measuring elastic materials such as resin and thin parts that would otherwise deform if using a contact probe.

Ultra-high-speed data collection

SurfaceMeasure 1110 acquires 3D shape data at high speed and with high density. Measurement width is 110 mm and measurement depth is 100 mm, so even deep structures can be measured in a single scan.

Non-spraying powder measurement

SurfaceMeasure 201FS uses a flying spot method to achieve high shape reproducibility, even when measuring edges. Additionally, since the laser intensity is automatically adjusted, stable shape data can be obtained even for objects with mixed colors or varying reflectivity.

Application examples

The collected point cloud data can be used for a variety of purposes using a wide range of optional software, including various types of editing, surface generation, comparison with CAD data, and conversion into CAD data.



SurfaceMeasure 1110



SurfaceMeasure 201FS



Measurement of color sample plate



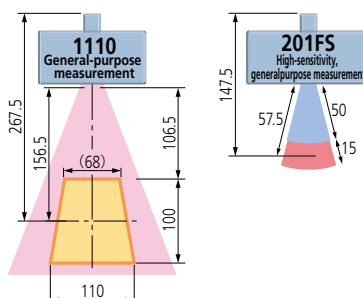
Measurement of reflective workpiece

SurfaceMeasure

		SurfaceMeasure 1110	SurfaceMeasure 201FS
Laser irradiation method		Beam expansion	Flying spot
Max. scan width		110 mm	23 mm
Max. scan depth		100 mm	15 mm
Working distance		155 mm	57.5 mm
Scanning dispersion value ^{*1} (1 σ)		9 μ m	1.8 μ m
Scanning dispersion value ^{*2} (95%) <i>P form, Sph, D95%, Tr, ODS</i>		36 μ m	8.0 μ m
Max. Acquisition rate		300,000 points/sec.	25,000 points/sec.
Mass		440 g	500 g
Laser Class	EN/IEC	Class2 [IEC60825-1:2014, EN60825-1:2014+A11:2021]	
	JIS	Class2 [JIS C 6802 : 2014]	
	Laser Type	Semiconductor	
Line Laser	Wave length	660 nm	670 nm
	Output	2.5 mW	1 mW

*1 According to Mitutoyo's test procedure. (1 σ /sphere measurement, probe alone)

*2 According to ISO10360-8:2013 test procedure. (probe alone)



MSURF-S/MSURF-I

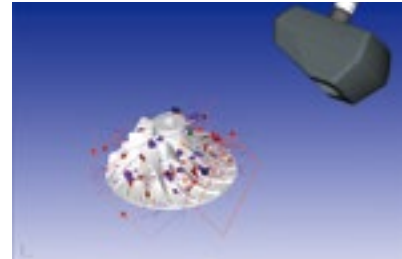
Scanning (MSURF-S)

Scanning paths can be created by simply defining three items: the scanning starting point, the scanning length, and the scanning width. These three items can be easily defined by using the joystick while checking the camera preview.



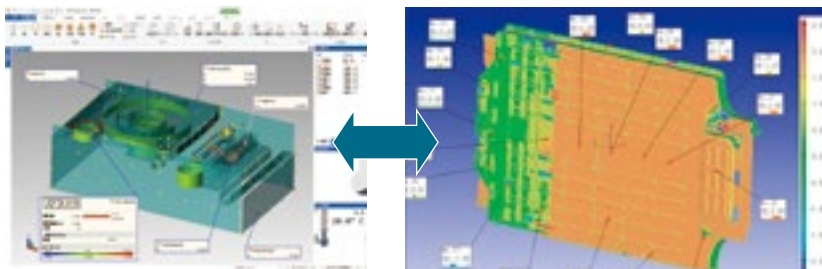
●MSURF-PLANNER (optional)

MSURF-PLANNER software automatically generates measurement macros (surface shape, element shape) for line laser probes from 3D CAD data. The optimized measurement path (movement path, number of probe head rotations, etc.) helps increase productivity.



Automatic generation of measurement macros by MSURF PLANNER

Since MSURF-S can be started from MCOSMOS, automatic measurements that merge "contact" and "non-contact" measurements can be executed.



* If the work coordinate system created in MCOSMOS is used, positioning by the software programs designed for processing point-cloud data is not required.

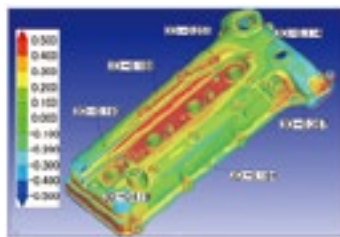


* Note: If ACR3 is not used, the probe must be manually changed.

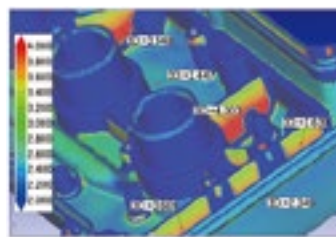
Inspection (MSURF-I)

●Planar shape comparison

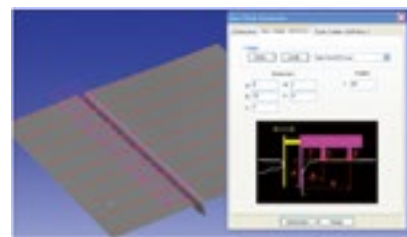
Point-cloud data or mesh data can be compared with CAD data, and the planar shape errors displayed on a color map.



Color map of errors



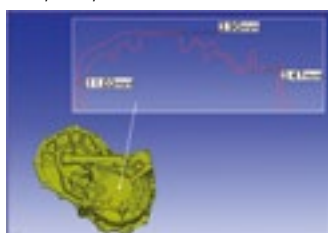
Color map of wall thickness



Evaluation of steps and gaps

●Comparison of cross-sectional shapes

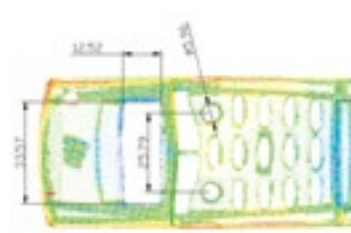
Point-cloud data / mesh data and CAD data can be cut at the specified position to compare cross-sectional shapes or compute angles, distances, radii, etc.



Cross-sectional evaluation (dimension computation)

●Feature-by-feature comparison

Various features can be detected from point-cloud data or mesh data and compare them to the design data.



Various kinds of elements computation

QVP Quick Vision Probe



Provides image measuring capability for CMMs

The **QVP** probe performs form measurement by image processing micro geometry that cannot be measured by a contact type probe, or elastic bodies that are easily deformed by slight measuring forces. Although the method of microscopic measurement with a centering microscope mounted on the CMM has been used since CMMs came into use in the industry, they have an inherent disadvantage in that the operation of identifying positions is dependent on the operator's eye, resulting in possible measurement errors. Even with a CNC CMM manual measurement must be performed sometimes, such as with an installed centering microscope. The **QVP** probe is a vision probe dedicated for CMMs and was developed based on Mitutoyo's state-of-the-art technology, in order to enable full automation of image measurement with a CNC CMM.

Automatic detection of workpiece edge

The **QVP**-captured image will have various automatic edge detections performed by the dedicated software, VISIONPAK, and then various calculation processes (calculation of dimensions and geometrical deviations) will be performed by the general-purpose measurement program, Geopak.

Standard provision of white LED illumination

Since the **QVP** is equipped with the standard co-axial light running through the lens system as well as white-light LED ring illumination, which is bright and has a long service life, no auxiliary illumination is required. The light volume can be set to between 0 and 100% in 1% increments.

Use with an Automatic Probe Changer

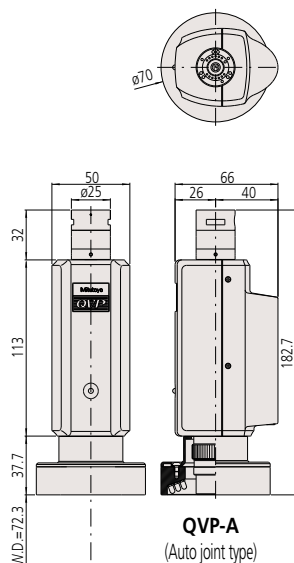
The **QVP** can also be mounted on an automatic probe changer, allowing full-automatic measurement with both contact and non-contact probes.



QVP Specifications

QVP main unit	CCD size		1/3 inch (B/W)			
	Optical tube magnification		0.375×			
	Illuminating function	Co-axial	White light LED source (built-in): Power dissipation 5 W or less			
		Ring	White light LED source: Power dissipation 10 W or less			
	Mass		Automatic-joint type: 315 g, shank type: 390 g			
	Optical magnification		0.375×	1.125×	1.815×	3.75×
	Observation range (mm)		9.6×12.8	3.2×4.3	1.9×2.6	1×1.3
	Working distance (mm)		61	72.3	61	51
Objective	Magnification		ML1× Optional	ML3× Standard	ML5× Optional	ML10× Optional
	Numerical Aperture (N.A.)		0.03	0.09	0.13	0.21
	Depth of focus (μm)		306	34	16.3	6.2
	Mass		80 g	55 g	60 g	95 g
QVP I/F BOX	Supply voltage		AC100 to 240 V			
	Frequency		50/60 Hz			
	Power capacity		30 W			
	Mass		3800 g			

Dimensions



Unit: mm

Optional accessories



Objective ML1X (375-036-2)
Objective ML5X (375-034-1)
Objective ML10X (375-039)



Calibration gage (02AQC310)
• Gage for sharing the coordinates between the QVP and contact-type probe

Calibration chart (02AKN020)
• Gage for calibrating a single QVP unit



Data processing unit

• VISIONPAK-PRO image measurement software

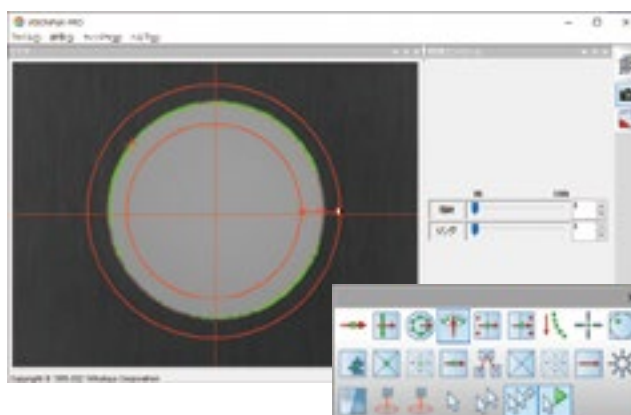
VISIONPAK-PRO is a software that processes images obtained with QVP, automatically detects the edges of the object to be measured, and obtains measurement points. Measurement speed has been significantly improved compared to the conventional VISIONPAK, reducing measurement time by up to 83%.

• Wide variety of image processing functions

The software is equipped with the standard one-click tool that allows you to easily perform edge detection, which is important in image measurement. Furthermore, VISIONPAK-PRO is newly equipped with a robust edge detection function and a morphology filter, greatly improving edge detection ability.

• Outlier removal function

In ordinary micro-form measurement it is often difficult to remove burrs and dusts from the objective workpiece, resulting in an inevitable measurement error. In contrast, VISIONPAK can recognize, for example, the obstruction as an "outlier" and bypass it during measurement.

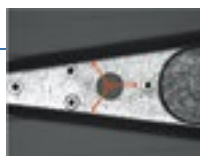


VISIONPAK-PRO Image Processing Tool



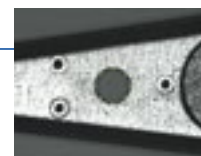
Simple tool

Used for detecting a single point on the edge pointed to by the arrow.



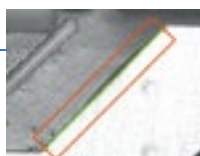
Manual tool

Used for detecting an optional position pointed to (clicked on) by the mouse.



Box tool

Used for multiple-point line measurement of an edge caught in the box



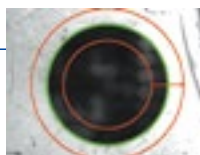
Centroid tool

Used for detecting the center of gravity of an optional form.



Circle tool

Used for multiple-point measurement of a circle for the objective circular edge. As with the box tool, it can collect data that is free from the effect of burrs and dust.



Edge self-tracing tool

By simply specifying the start point and measurement interval, the objective edge can be detected while automatically tracing an unknown geometry.



CF20 Centering Microscope for CMMs



Use the CMM as a large microscope

The **CF20** is a centering microscope that enables measurement of small holes and elastic bodies which are difficult for a touch-trigger probe to measure. With the **CF20** the CMM can be used as a large microscope.

Optional accessories to implement various evaluations

To cope with the size and form of a workpiece to be observed and measured, lenses of various magnifications and reticles for form comparison are provided.

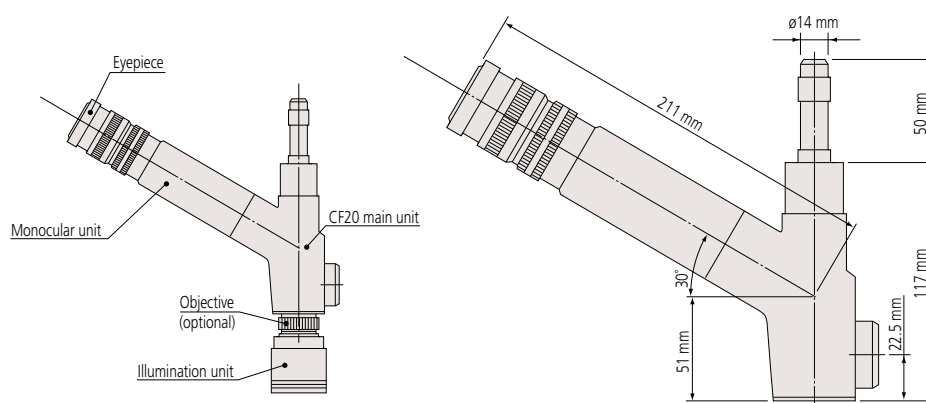
CCTV Monitor System for CMM with CF20 (optional)

CCD camera (optional) to be installed on model **CF20**. The image can be viewed on the monitor of the PC on which the dedicated software is installed. This is a great aid in relieving eye stress, especially if several hours of work must be done.

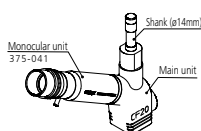


CCTV Monitor System for CMM with CF20 (optional)

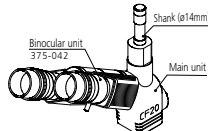
CF20 monocular set dimensions



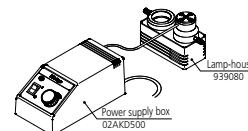
CF20 monocular set (375-201)



CF20 binocular set (375-202)



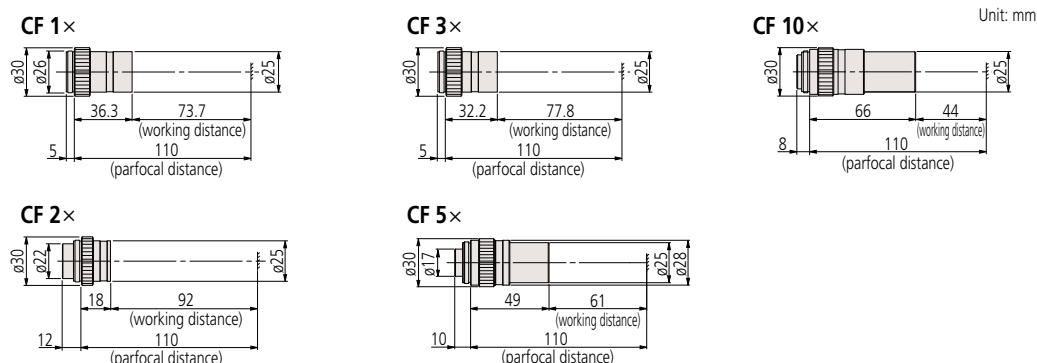
Illumination unit (375-071)



CF20 main unit

Description	Specification	Objective	Accessory
CF20 monocular set (375-201)	CF10X eyepiece, field number 22 Cross hair and concentric circle reticle	—	1. Illumination unit (375-071) 2. Spare lamp (162151) 3. Lens cap 4. Tools
CF20 binocular set (375-202)	CF10X eyepiece, field number 22 / Cross hair and concentric circle reticle (right) Pupil distance adjustment: 51 - 76 mm	—	5. Power cable 6. User's Manual 7. Storage box

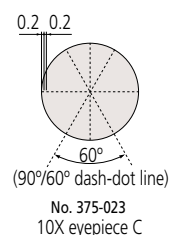
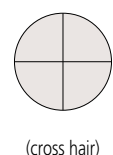
Objectives (optional)



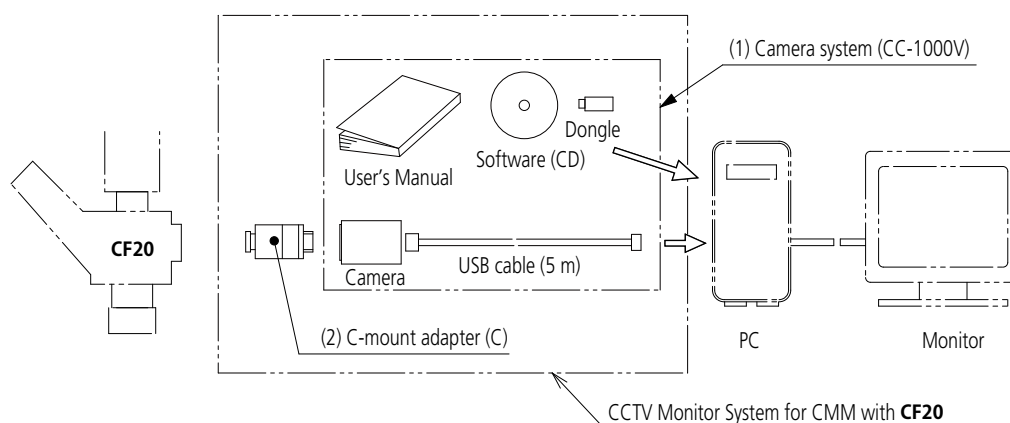
*Parfocal distance is the design value.

Code No.	Description	Numerical Aperture (N.A.)	Working distance W.D. (mm)	Resolution R (μm)	Depth of focus of single objective lens $\pm\text{D.F.}$ (μm)	Real field of view (mm)		Mass (g)
						$\phi 24$ eyepiece	1/2 type Camera (vertical & horizontal)	
375-031	CF 1×	0.03	73.7	9.2	306	24	4.8×6.4	45
375-032	CF 2×	0.06	92.0	4.6	76	12	2.4×3.2	35
375-033	CF 3×	0.07	77.8	3.9	56	8	1.6×2.1	35
375-034-1	CF 5×	0.13	61.0	2.12	16.3	4.8	0.96×1.28	75
375-035	CF 10×	0.18	44.0	1.5	8	2.4	0.48×0.64	100

* Values for resolution and depth of focus of a single objective lens are calculated based on the reference wavelength ($\lambda = 0.55 \mu\text{m}$).



CCTV Monitor System for CMM with CF20 [Code No. 320-055]



Ref. No.	Description	Qty
1	Camera system	1
2	C-mount adapter (C)	1

SURFTEST PROBE Surface Roughness Probe



Roughness measurement function added to CNC CMM

The **SURFTEST PROBE** is a probe that can measure surface roughness while mounted on a CNC CMM.

This probe uses a skid-type roughness detector that allows roughness measurement using a linear drive inside the probe. Dedicated software SURFPAK-SP is used for roughness measurement and analysis.

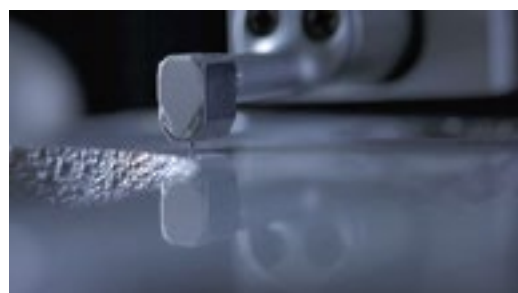
Batch processing from dimensional measurement to roughness measurement

This probe allows contact roughness measurement without changing a workpiece setup on a CMM. If a SURFTEST probe is mounted on the PH10M/PH10MQ, roughness measurement of tilted surfaces is enabled by changing the probe orientation. The CMM can also use other CMM probes along with a SURFTEST probe, thus allowing fully automatic measurement from dimensions to surface roughness using the Auto Probe Changer ACR3, etc.

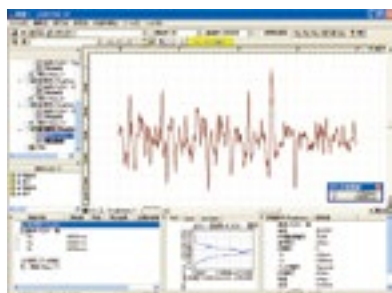
Options

Thanks to the knowhow accumulated in the portable surface roughness tester SJ series, several types of surface roughness detectors are available to suit various types of workpiece.

A cleaning unit (option) is also available to clean the roughness detector should it become contaminated with coolant, etc. This allows improvement in reliability of roughness measurement.



SURFPAK-SP

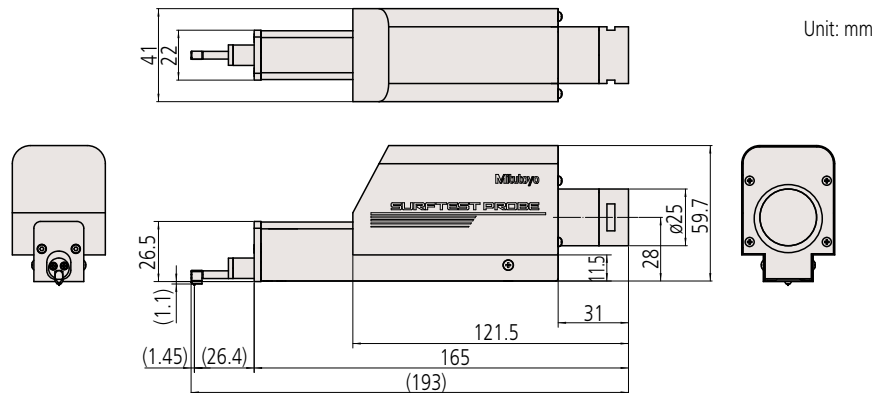


SURFPAK-SP is a software program specific to the **SURFTEST** surface roughness probe for a CMM, and allows surface roughness analysis conforming to standards such as ISO, JIS, ANSI and VDA. Working with MCOSMOS, fully automatic dimensional measurement and surface roughness measurement are enabled.

SURFTEST PROBE Specifications

SURFTEST PROBE	Measuring range	AUTO, 40, 100, 360 μm
	Drive range	16 mm
	Measuring speed	0.25, 0.5, 0.75 mm/s
	Stylus tip radius	2 μm
	Measuring force	0.75 mN

Dimensions



Configuration

Description	Qty
SURFTTEST PROBE Set	1
SURFTTEST PROBE main unit	
Storage box	
SURFTTEST PROBE Interface unit	1
USB CBL	1
Hardware guide	1

Optional units

Essential options

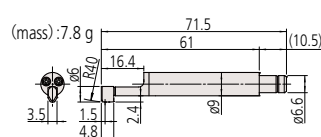
① Roughness detector	178-270 (0.75 mN, 60° R2 μm) 178-280 (4 mN, 90° R5 μm)
② Roughness specimen	178-601 (mm) 178-602 (inch/mm)

Option

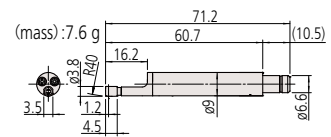
Part No.	Name
178-270	Roughness detector (0.75 mN, 60° R2 μm)
178-280	Roughness detector (4 mN, 90° R5 μm)
178-281	Roughness detector (4 mN, 90° R10 μm)
178-272	Small hole detector (0.75 mN, 60° R2 μm)
178-282	Small hole detector (4 mN, 90° R5 μm)
178-273	Extra small hole detector (0.75 mN, 60° R2 μm)
178-283	Extra small hole detector (4 mN, 90° R5 μm)
178-274	Deep groove detector (0.75 mN, 60° R2 μm)
178-284	Deep groove detector (4 mN, 90° R5 μm)
178-275	Gear-tooth surface detector (0.75 mN, 60° R2 μm)
178-285	Gear-tooth surface detector (4 mN, 90° R5 μm)

Optional parts

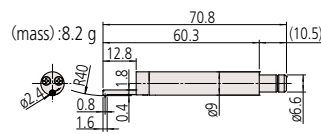
Part No.	Name
02AQJ101	Cleaning unit
02AQJ207	Calibration stage
02AQJ210	Support magnet (ACR3)



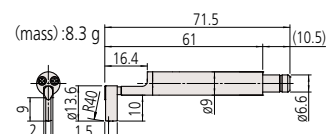
Roughness detector (178-270/178-280/178-281)



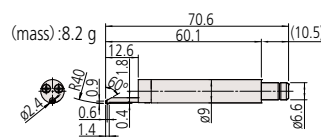
Small hole detector (178-272/178-282)



Extra small hole detector (178-273/178-283)



Deep groove detector (178-274/178-284)



Gear-tooth surface detector (178-275/178-285)

TP7M High-accuracy Touch-trigger Probe



High-accuracy touch-trigger probe

This is a high-accuracy touch-trigger probe with a maximum repeatability of $2\sigma \leq 0.25 \mu\text{m}$.

Enhancing the setup and measurement efficiency through automatic change of probe orientations

Since the **TP7M** can be mounted on a probe head, such as the **PH10M/PH10MQ** that automatically changes the probe orientation, it can greatly reduce the preparation time for measurement and for actual measurement in comparison to a conventional-type scanning probe with a position that is fixed downward. In addition, the use of other probes, as advantaged by the probe change system, makes it possible to realize full automation in measuring various forms of machined parts.

Suitable for use with long styli

The **TP7M** can mount a stylus up to 150 mm long*. In combination with the longest extension of 200 mm equipped for the **PH10M/PH10MQ**, it can reach a position at a maximum distance of 350 mm.

* This maximum length may vary with the CMM main unit being used and/or the material/diameter of the stylus itself.

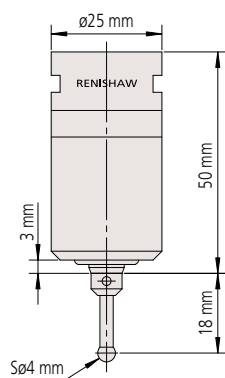


TP7M Specifications

TP7M	Measuring direction	$\pm X, \pm Y, \pm Z$	
	Standard stylus	$\varnothing 4 \times 18$	
	Directionality (XY: 2D)	0.25 μm or less (When the standard stylus is used)	
	Required force to generate trigger signal	XY	0.02N (When the 50 mm stylus is used)
		Z	0.15 N (When the 50 mm stylus is used)
	Amount of over-travel	XY	$XY \pm 16^\circ$
		Z	$\pm 5 \text{ mm}$
	Required force to achieve over-travel	XY	0.78 N (When the 50 mm stylus is used)
		Z	11.75 N (When the 50 mm stylus is used)
	Maximum stylus length	150mm*	
	Stylus mounting method	M4 thread	
	Mass of a single unit	85 g	
	Durability	10,000,000 times	
	Probe head	Essential: PH10M/PH10MQ	
	Applicable models	CNC CMMs	

* Increase in stylus length or stylus mass may deteriorate the accuracy.

Dimensions



TP7M Set

Ref. No.	Description	Qty
1	TP7M main unit	1
2	Joint key S10	1
3	M4 Stylus tool	2

TP200 Compact High-accuracy Touch-trigger Probe



Compact high-accuracy touch-trigger probe

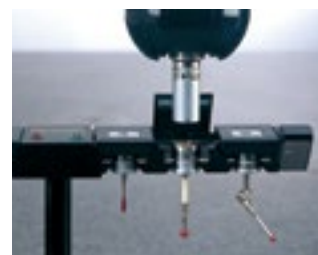
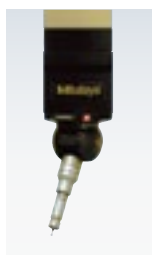
This touch-trigger probe has an outside diameter as small as $\varnothing 13.5$ mm, which greatly contributes to probing complex portions of a workpiece. With the combined use of an appropriate probe extension it can probe even deeper locations.

Enhancing the setup and measurement efficiency through the automatic change of probe orientations

Since the **TP200** can be mounted on a probe head, such as the **PH10M/PH10MQ** that automatically changes the probe orientation, it can drastically reduce the time required to prepare for measurement and for actual measurement in comparison to a conventional-type scanning probe with a position that is fixed downward.

Automatic stylus change

If the measurement cannot be performed by merely changing the probe orientation (such as when it is impossible to measure without replacing the normal stylus with one that has a different diameter or unique form), this automatic stylus change via the stylus change system allows fully automatic measurement to be completed without being interrupted mid-course. In addition, working with other probes, as advantaged by the probe change system, makes it possible to realize full automation in measuring various forms of machined parts.

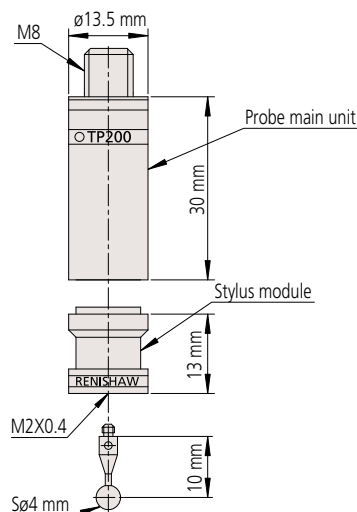


TP200 Specifications

TP200	Measuring direction	$\pm X, \pm Y, \pm Z$	
	Repeatability (2σ)	0.36 μm (with 10 mm stylus)	
	Required force to generate trigger signal	XY	0.02 N (STANDARD FORCE) with 50 mm stylus
		Z	0.07 N (STANDARD FORCE) with 50 mm stylus
	Amount of over-travel	XY	$XY \pm 14^\circ$
		Z	+4.5 mm
	Required force to achieve over-travel	XY	0.2 N to 0.4 N (STANDARD FORCE) 0.1 N to 0.15 N (LOW FORCE)
		Z	4.9 N (STANDARD FORCE) 1.6 N (LOW FORCE)
	Maximum stylus length	70 mm (STANDARD FORCE) *	
	Maximum stylus mass	30 mm (LOW FORCE) *	
	Stylus mounting method	M2 thread	
	Mass of a single unit	22 g	
	Durability	10,000,000 times	
	Probe head	Essential: PH10M/PH10MQ/PH6M/PH1	
	Applicable models	CNC CMMs	
	Note	Any stylus less than $\varnothing 1\text{mm}$ should be used with the LOW FORCE module. Not suitable for use in strong magnetic fields.	
SCR200	Stylus module replacement accuracy	Repeated positioning accuracy: 1.0 mm or less (through automatic change), when a 50 mm stylus is used. *2.0 mm or less at a manual replacement: when a 50 mm stylus is used.	
	Number of stylus modules that can be mounted	Maximum 6 units	

* Increase in stylus length or stylus mass may deteriorate the accuracy.

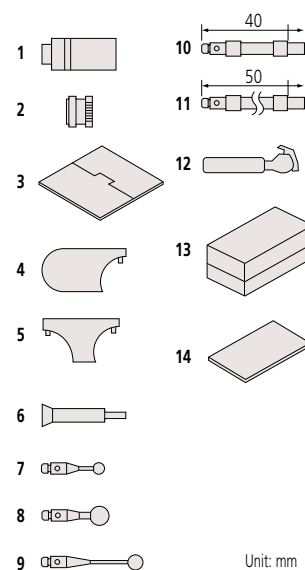
Dimensions



Set configuration

Unit	Ref. No.	Description	Qty	Remarks
Touch-trigger probe TP200 set 06AAL268	1	TP200 probe	1	
	2	Stylus module (standard)	1	Standard measuring force (at over-travel)
	3	Cleaning tool	1	For cleaning the stylus module
	4	Twin-ended wrench	1	For attaching/detaching the probe (S1)
	5	Double-ended wrench	1	For attaching/detaching the probe (S9)
	6	Stylus tool	1	For attaching/detaching the stylus (S7)
	7	MS2-4R10	1	Standard stylus $\varnothing 4 \times 10$ (M2)
	8	MS2-6R10	1	$\varnothing 6 \times 10$ (M2)
	9	MS2-4R20	1	$\varnothing 4 \times 20$ (M2)
	10	MS2-EXT40G	1	Extension 40 mm Carbon fiber
	11	MS2-EXT50G	1	Extension 50 mm Carbon fiber
	12	Carbon extension attachment tool	1	
	13	Wooden box	1	Stylus storage box
	14	User's Manual	1	

Note: Some items cannot be ordered separately.



Optional accessories Stylus Changing Rack SCR200

Automatic stylus change system kit

No.	Description	Qty	Specification (use)	Mass (kg)
1	Stylus module (low measuring force)	1	For ball stylus less than $\varnothing 1$	0.01
2	Stylus module (standard)	3	Standard measuring force (at over-travel)	0.04
3	SCR200 kit	1	With a rack mount kit	0.93
4	PL63	1	PI200-SCR200 connection cable	0.15

* Depending on the stylus to be equipped, the stylus and SCR200 may interfere.



TP20 Compact Touch-trigger Probe



Compact touch-trigger probe

This touch-trigger probe has an outside diameter as small as $\phi 13.2$ mm, which greatly contributes to probing complex portions of a workpiece. With the combined use of an appropriate probe extension it can probe even deeper locations.

Enhancing the setup and measurement efficiency through the automatic change of probe orientations

Since the **TP20** can be mounted on a probe head such as the **PH10M/PH10MQ** that automatically changes the probe orientation, it can drastically reduce the time required to prepare for measurement and for actual measurement in comparison to a conventional-type scanning probe that has a position fixed downward (when it is mounted on the CNC CMM).

Automatic stylus change

If the measurement cannot be achieved by simply changing the probe orientation (such as when it is not possible to make measurements without replacing the normal stylus with one having a different diameter or unique form), automatic stylus change via the stylus change system allows fully automatic measurement to be completed without mid-course interruption. In addition, the use of other probes as advantaged by the probe change system makes it possible to realize full automation in measuring various forms of machined parts (when it is mounted on the CNC CMM).

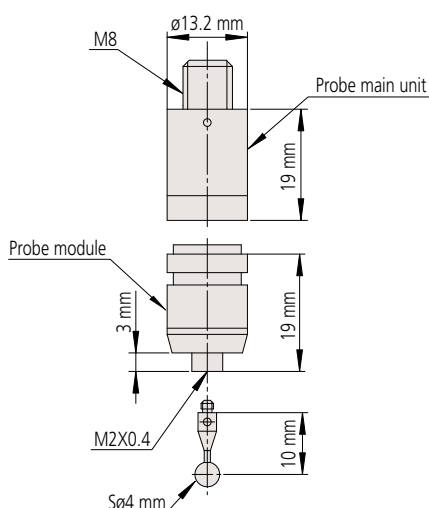


TP20 Specifications

TP20	Measuring direction	$\pm X, \pm Y, +Z$	
	Repeatability (2σ)	0.35 μm or less (with the STANDARD FORCE 10 mm stylus)	
	Required force to generate trigger signal	XY	0.08 N (STANDARD FORCE) , with 10 mm stylus 0.1 N (MEDIUM FORCE) , with 25 mm stylus
		Z	0.75 N (STANDARD FORCE) , with 10 mm stylus 1.9 N (MEDIUM FORCE) , with 25 mm stylus
	Amount of over-travel	XY	$\pm 14^\circ$
		Z	+4.0 mm (STANDARD FORCE) +3.7 mm (MEDIUM FORCE)
	Required force to achieve over-travel	XY	0.2~0.3 N (STANDARD FORCE) 0.2~0.4 N (MEDIUM FORCE)
		Z	3.5 N (STANDARD FORCE) 7 N (MEDIUM FORCE)
	Maximum stylus length	50 mm (STANDARD FORCE) *	
	Maximum stylus mass	60 mm (MEDIUM FORCE) *	
	Stylus mounting method	M2 thread	
	Mass of a single unit	22 g (probe body: 13 g, probe module: 9 g)	
	Durability	1,000,000 times	
	Probe head	Essential: PH10M/PH10MQ/PH1	
	Applicable models	Manual/CNC CMMs	
	Note	Not suitable for use in strong magnetic fields.	
MCR20	Stylus module replacement accuracy	Repeatability positioning accuracy: 1.0 μm or less (through automatic change), when a 10 mm stylus is used. *2.0 μm or less at a manual replacement: when a 50 mm stylus is used.	
	Number of stylus modules that can be mounted	Maximum 6 units	

* Increase in stylus length or stylus mass may deteriorate the accuracy.

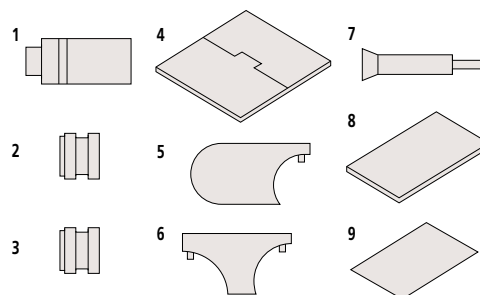
Dimensions



Set configuration

	Ref. No.	Description	Qty	Specification (use)
Touch-trigger probe TP20 set 06AAV547	1	TP20 probe main unit	1	
	2	Probe module [STANDARD]	1	Measuring force (small)
	3	Probe module [MEDIUM]	1	Measuring force (medium)
	4	Cleaning tool	1	For cleaning stylus module
	5	Single-ended wrench	1	For attaching/detaching probe
	6	Double-ended wrench	2	For attaching/detaching probe
	7	Stylus tool	1	For attaching/detaching stylus
	8	User's Manual	1	
	9	Certificate	1	
				Total mass including package

Note: Some items cannot be ordered separately.



Optional accessories

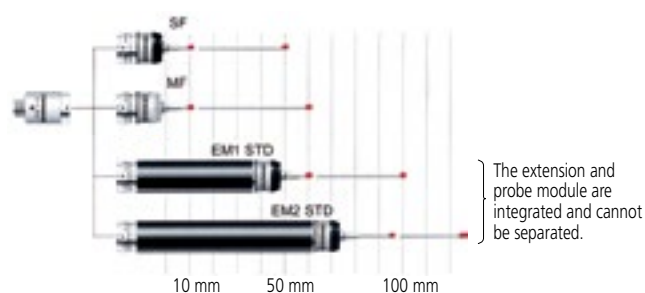
Stylus module

Standard force module

Medium force module

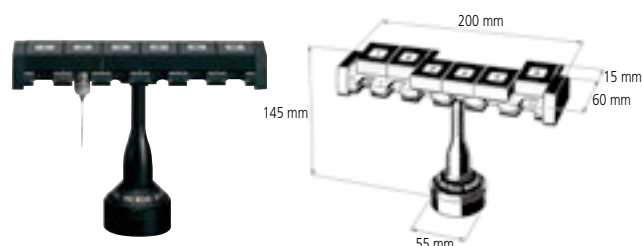
EM1 (Standard force module with extension)

EM2 (Standard force module with extension)



Stylus Changing Rack MCR20

MCR20 set	1	1.3	Accessories	
			• $\varnothing 2 \times 30$ mm stylus	1
			• Probe module (standard force)	2
			• Mounting kit	1



MH20i Touch-trigger Probe with Manual Probe Head



Touch-trigger probe with manual probe head

This series of touch-trigger probes has a manually operable probe head for CMMs. The probe module has an outside diameter as small as $\varnothing 13.2$ mm, which greatly aids in probing complex portions of a workpiece. Other probe modules employing an extension either 50 mm or 70 mm long are also provided.

Capable of positioning its orientation

The probe head of the **MH20i** has a structure that not only permits its position (probe orientation) to be manually changed but also provides a maximum of 168 orientations (at a positioning repeatability $\sigma \leq 1.5 \mu\text{m}$). Even for measurement of a complex three-dimensional form that requires repeated changes in the probe orientation, preliminary registration of required positions can eliminate re-calibration after each positional change, thereby broadly improving the measurement efficiency.

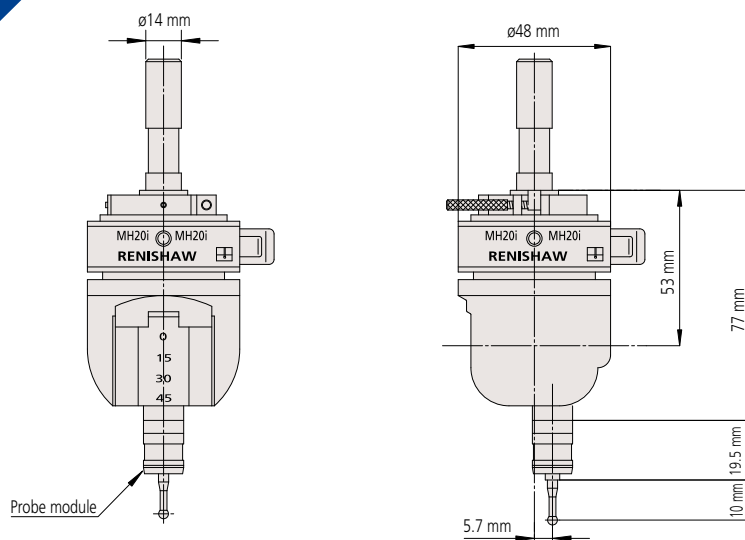


MH20i Specifications

MH20i	Measuring direction	$\pm X, \pm Y, +Z$	
	Position change	Manually for A axis (vertical direction): 0 to 90° (at 15° increments), and for B axis (horizontal direction): $\pm 180^\circ$ (at 15° increments)	
	Repeated positioning accuracy	1.5 μm (2σ)	
	Repeatability (2σ)	0.35 μm or less (with the STANDARD FORCE 10 mm stylus)	
	Required force to generate trigger signal	XY	0.08 N (STANDARD FORCE), with the 10 mm stylus 0.1 N (MEDIUM FORCE), with the 25 mm stylus
		Z	0.75 N (STANDARD FORCE) 1.9N (MEDIUM FORCE)
	Amount of over-travel	XY	$\pm 14^\circ$
		Z	+4.0 mm (STANDARD FORCE) +3.7 mm (MEDIUM FORCE)
	Required force to achieve over-travel	XY	0.2~0.3 N (STANDARD FORCE) 0.2~0.4 N (MEDIUM FORCE)
		Z	3.5 N (STANDARD FORCE) 7 N (MEDIUM FORCE)
	Maximum stylus length	50 mm (STANDARD FORCE) *	
	Maximum stylus mass	60 mm (MEDIUM FORCE) *	
	Stylus mounting method	M2 thread	
	Mass of a single unit	210 g (excluding shank)	
	Durability	1,000,000 times	
	Probe head	Essential: PH10M/PH10MQ/PH1	
	Applicable models	Manual/CNC CMMs	
	Note	Not suitable for use in strong magnetic fields.	

* Increase in stylus length or stylus mass may deteriorate the accuracy.

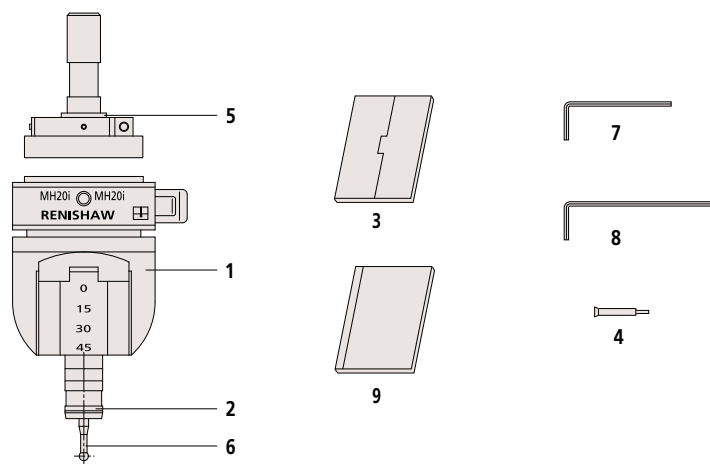
Dimensions



Set Configuration

Unit	Ref. No.	Description	Qty	Mass (kg)	Remarks
MH20i single unit Code No. 06ABN436	1	MH20i	1	0.25	
	2	Probe module	1	0.01	STANDARD TYPE
	3	Cleaning tool	1	0.05	For cleaning the stylus module
	4	MS2-stylus tool	1	0.003	For attaching/detaching the stylus
	5	Positioning shank	1	0.15	
MH20i set Code No. 06ABN470	6	Stylus	1	0.001	ø4X10 (standard stylus)
	7	Allen key (2 mm)	1	0.001	
	8	Allen key (3 mm)	1	0.001	
	9	User's Manual	1	0.1	

Note: Some items cannot be ordered separately.



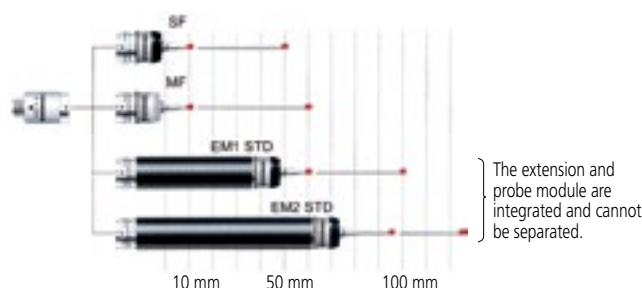
Optional accessories Stylus modules

Standard force module

Medium force module

EM1 (Standard force module with extension)

EM2 (Standard force module with extension)



PH10M/PH10MQ Motorized Probe Head



Enhancing measurement efficiency through automatic probe indexing

This probe head can automatically control the position of a probe attached at the end. Automatic position change can be performed by simply specifying the angle through the supplied control box or the dedicated software during teaching and setting it to recall the position from memory.

Moreover, this automatic position change allows for measurement to be completed in much less time than the automatic stylus change method, reducing the total number of man-hours required to perform measurement with the CMM.

High-accuracy indexing to 720 positions

Since the **PH10M/PH10MQ** can set the attached probe to a maximum of 720 different positions, even one stylus can function as if 720 styli are attached. In addition, since this probe head has a repeatability to the same position as high as $2\sigma \leq 0.4 \mu\text{m}$, it does not require re-calibration for measurement in which the same position must be repeatedly called.

Possible to mount various kinds of probe

This head can mount various probes including, but not limited to, a touch-trigger probe, scanning probe, vision probe, laser probe, and thread depth measuring probe.

Furthermore, these probes can be easily interchanged by means of the probe changer (optional), which enables fully automatic measurement on a wide range of measurement objects.

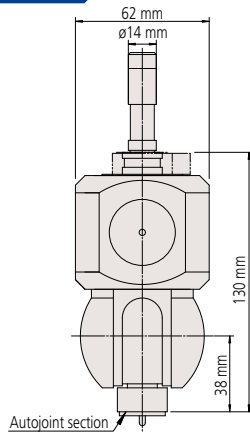
* Note that some probes are not compatible with this automatic probe change.



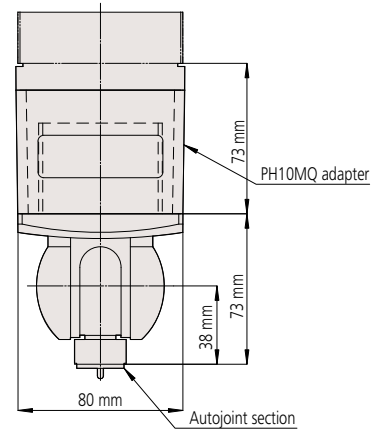
PH10M/PH10MQ Specifications

PH10M/PH10MQ	Position change	Horizontal direction	$\pm 180^\circ$ (at 7.5° increments, 48 positions)
		Vertical direction	0 to 105° (at 7.5° increments, 15 positions)
	Repeated positioning accuracy	$2\sigma \leq 0.4 \mu\text{m}$ (when the PAA1+TP20+L10 mm stylus is used.)	
	Extension	PEM1, PEM2, PEM3, PAA1, PAA2, PAA3 More than one extension cannot be joined for use. However, combined use of PAA+PECF1, PAA1+PECF2, and PAA1+PECF3 are permitted. Use on an extension is not permitted for the SurfaceMeasure/QVP.	
	Applicable models	CNC CMMs	
	Durability	1,000,000 times	

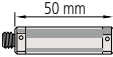
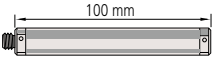
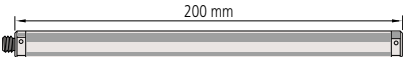
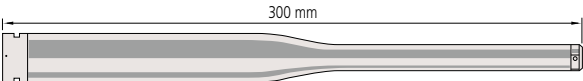
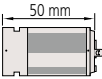
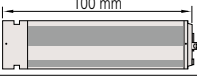
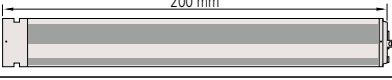
PH10M dimensions



PH10MQ dimensions



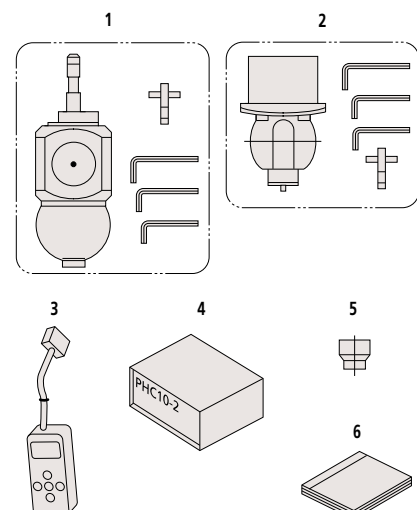
Extensions

Model	Dimension	Remarks
PAA1	 *Total length after probe head is installed is 30 mm.	For TP200/TP20
PECF1		For TP200/TP20
PECF2		For TP200/TP20
PECF3		For TP200/TP20
PAA3		For TP200/TP20
PEM1		For SP25M/TP7M
PEM2		For SP25M/TP7M
PEM3		For TP7M

Set configuration

No.	Description	Qty	Remarks
1	PH10Mplus head set	1	
	PH10M head		
	Joint key S10		
	Allen key (nominal 1.5)		
	Allen key (nominal 2)		
2	PH10MQplus head set	1	
	PH10MQ head		
	Joint key S10		
	Allen key (nominal 1.5)		
3	HCU2	1	Controller for positioning the probe head: Options
4	PHC10-3plus	1	Interface with the machine-side CPU (for error display)
5	PAA1	1	Adapter for mounting the TP200 onto the PH10M
6	User's Manual	1	User's Manual for PH10M head

Note: Some items cannot be ordered separately.



PH6M Fixed Probe Head



Fixed probe head

Fixed probe head compatible with autojoint type probes and adapters. Multi-wire compatible probes such as **SP25M** and **TP200** are mounted and used facing downward.

When performing scanning measurements with the **MiSTAR** series, the measurement space can be used more effectively.

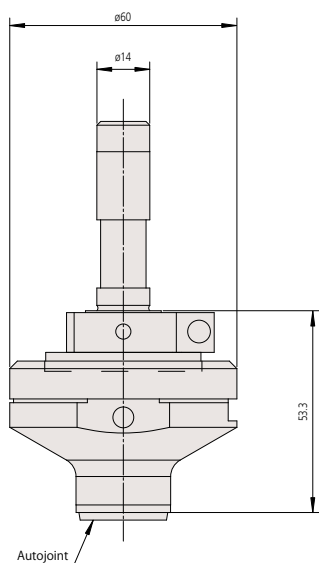


PM6M specifications

PH6M	Probe mounting	Autojoint (multi-wire)
	Probe status display	1 LED
	Cable connection	Micro D connector
	Mass	160 g

Dimensions

Unit: mm



Set configuration

For MiSTAR series

No.	Name	Quantity
1	PH6M	1
2	PH6M cable set	1
3	PI200 set	1
4	PAA1	1

PH1 Manual Probe Head



Manual probe head

Manual probe head for use with the TP200 and TP20.

Easy position change

The operator can change the probe orientation by hand.

Extension

It is possible to insert a probe extension that is a maximum of 200 mm long.

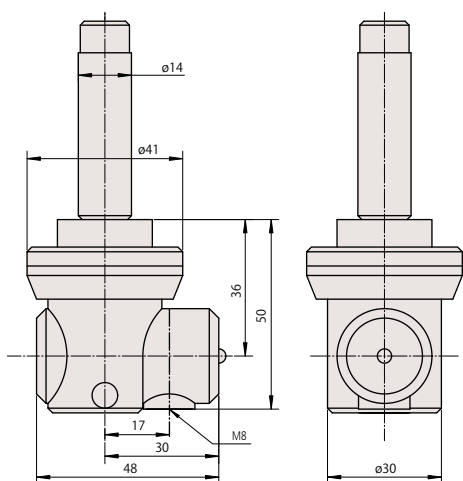


PH1 Specifications

PH1	Position change	Horizontal direction	360° (at 15° increments) Possible in a non-stop manner, if the head is rotated along with the $\varnothing 14$ mm shank unit.
		Vertical direction	$\pm 115^\circ$ (non-step)
	Mountable probe	TP200, TP20	
	Extension	PECF1, PECF2, PECF3	
	Applicable models	Manual/CNC CMMs	

Dimensions

Unit: mm



Optional accessories Extensions

PECF1	
PECF2	
PECF3	



PECF3 connection example

REVO-2 High-speed 5-axis Control Scanning Head



Ultra-high-speed 5-axis scanning

This scanning head allows ultra-high-speed scanning at up to 500 mm/s. With simultaneous control of a total of 5 axes (3 axes <X, Y and Z> on a CMM and 2 axes <A and B> on **REVO-2**), the CMM can perform non-step scanning of complex forms on a workpiece.

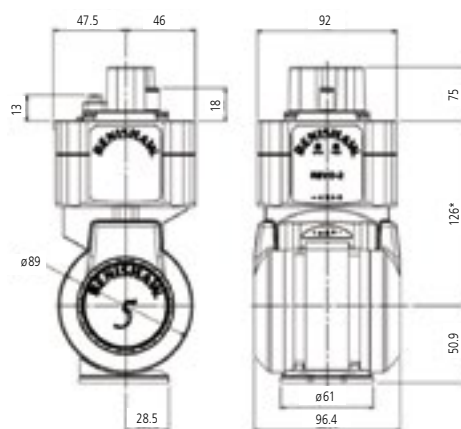
Various measurement operations specific to **REVO-2** are also available.

The use of a rotary encoder allows unlimited angle positioning (at a resolution of 0.08 sec). This enables easy access to a complicated workpiece, leading to a reduction of programming and measuring time periods.

The **REVO-2** probe is only available on the dedicated **CRYSTA-Apex EX 1200R** series.



Dimensions



Unit: mm

* With 4 mm mounting plate

REVO-2 Specifications

REVO-2	Mass		2100 g	
	Operative temperature	Humidity	18 to 22 °C	0 to 80 %*
	Storage temperature	Humidity	-10 to +70 °C	0 to 80 %*
	Rotating angle (A-axis)	Movement ranges are as follows. For RSP2: -5° to +120° For RSP3: -100° to +120°		
	Rotating angle (B-axis)	±∞		
	Positioning angular resolution	0.02 arc second		
	Max. scanning speed	500 mm/s		
	Sampling rate	4000 point/s		
	Probe installation	Permanent magnet		
	Axis of rotation	Air bearing		
	Air pressure	0.5 to 0.85 MPa		
	Air consumption	Max. 50 L/min		
	Compressed air clean grade	ISO 8573-1 Class 4		

* Operative temperature differs from guaranteed accuracy temperature.

PH20 5-axis Control Touch-trigger Probe System



Effective measurement of a complex workpiece using stylus movement

The PH20 head can position a touch-trigger probe at any angle, allowing unique "head touch" probing. This system has the advantage of measuring tilted surfaces and small, deep holes. There is no fear of interference from the stylus shank during measurement of a deep hole.

5-axis operation reduces the time required for probe rotational movements and supports 'head touch' operation for quick point measurement.

The system also supports the module changer using TP20 standard modules.

By combining optional software, a measurement program can be created on a PC using 3D CAD data.

Dimensions

TP20 standard force module, for standard stylus

Probe Head PH20



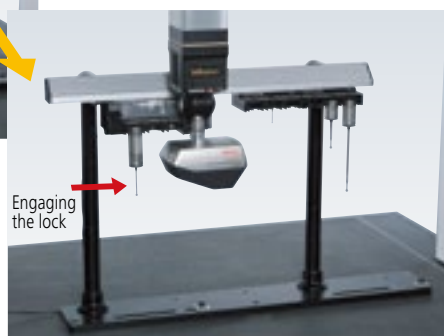
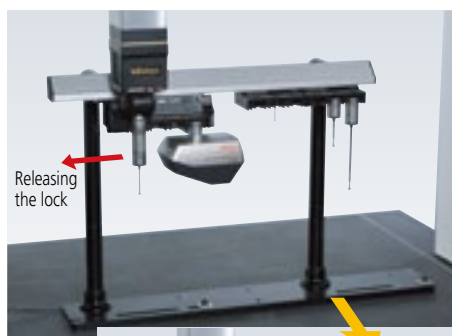
PH20 Specifications

PH20	Probe head body	Mass	810 g
		Operative temperature	10 °C to 40 °C*1
		Storage temperature	-25 °C to 70 °C*1
		Max. moving speed	1281 mm/s (*2 normal state)
		Max. probing speed	50 mm/s
		Rotating angle (A-axis)	±115 °
		Rotating angle (B-axis)	∞
		Bearing	Mechanical bearing
		Positioning angular resolution	0.4 μ Radians
		Automatic probe changer	TPCR20
		Max. stylus length	50 mm
		Stylus attachment	M2 thread
		Module attachment	Permanent magnet

*1 Operative temperature and storage temperature differ from guaranteed accuracy temperature.

*2 Stylus tip movement speed for a ruby stylus with a length of 12.15 mm and a ball diameter of ø4.

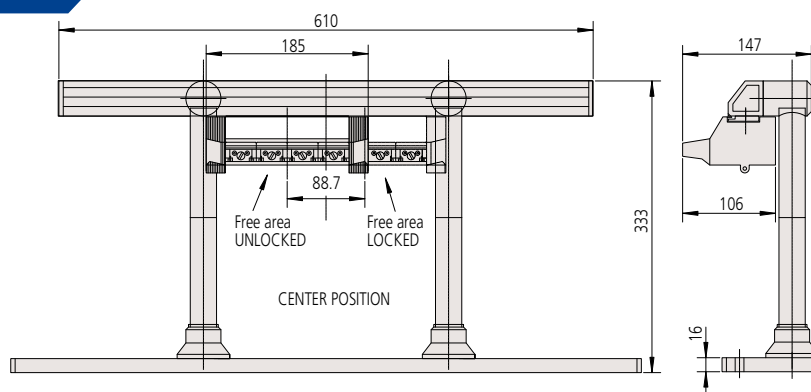
ACR3 Automatic Probe Changer



The need for an automatic probe changer

The **ACR3** is an automatic probe changer for use with the **PH10M/PH10MQ**. It is essential for fully automatic measurements where the currently employed probe does not have the capability of automatic stylus change but the stylus diameter or length must be occasionally changed, and where the contact-type probe and non-contact type probe are switched as required.

Dimensions

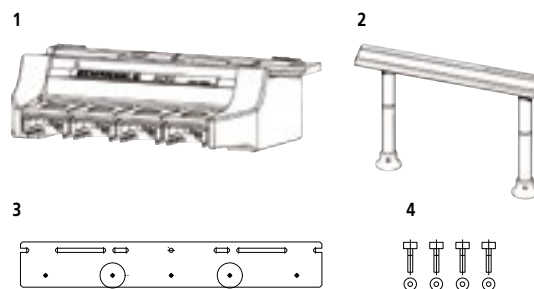


Unit: mm

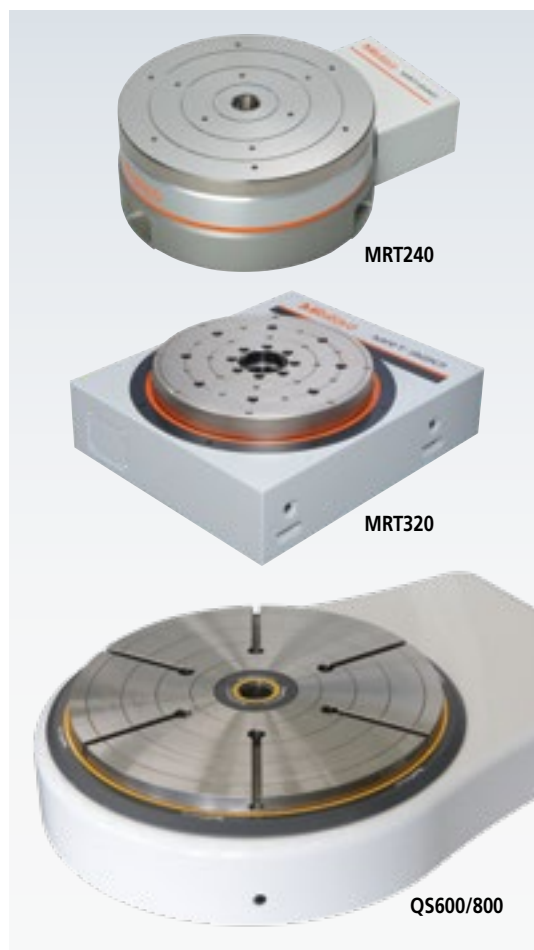
Set configuration

Unit	Ref. No.	Description	Qty	Remarks
ACR3 4-port system	1	ACR3	1	4-port rack
	2	MRS KIT2	1	Rack base
	3	Auxiliary plate	1	For fixture
	4	ACR3 attachment	1	Attachment
	5	User's Manual	1	
	6	MRS rail - 400mm	1	Rack base
ACR3 8-port system	1	ACR3	2	4-port rack
	2	MRS KIT2	1	Rack base
	3	Auxiliary plate	1	For fixture
	4	ACR3 attachment	1	Attachment
	5	User's Manual	1	
	6	MRS rail - 400mm	1	Rack base

Note: Some items cannot be ordered separately.



Rotary Tables for CNC CMMs



These optional rotary tables allow highly-accurate and efficient measurements of workpieces like rotationally symmetrical parts (gears, impellers and cylindrical cams). When used with a scanning probe, synchronized scanning measurements can be performed, enabling various contour measurements and advanced measurements.

MRT240

Compact and light weight but capable of supporting a workpiece of up to 40 kg. Can also be used with shop-floor type CNC CMM, MiSTAR series.

MRT320

A $\varnothing 60$ mm through hole on the center of the table allows measurements of long axial workpieces like long drive shafts.

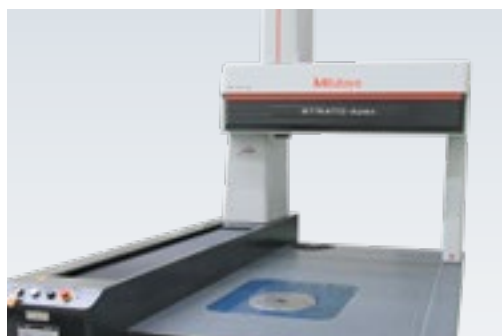
QS600/QS800

Suitable for measurements of large workpieces.

Specifications

Model		MRT240	MRT320	QS600	QS800
Dimensions(mm)	Depth	327	470	1000	1200
	Width	250	400	720	920
	Hight	105	150	160	
Table diameter (mm)		240	320	600	800
Mass (kg)		20	120	370	530
Max. load (kg)		40	100	1700	3000
Indexing accuracy (°)		$\pm 0.7''$	$\pm 0.7''$	2''	
Max. drive speed (rpm)		6	9	5	4

Customized special applications



Embedded in measuring table

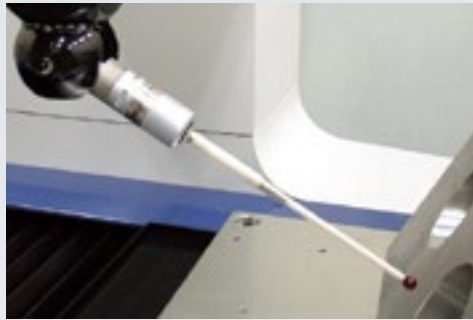


Air suspension

Quick guide to styli

The choice of stylus has an important effect on the accuracy of measurement obtainable from a CMM. Here is a quick guide on how to select a stylus.

The stylus is the part of a probe that makes contact with a workpiece, generally consisting of a stem and a ball tip. The probe functions by bringing the ball into contact with a workpiece to acquire a measurement from the resulting signal. The form and dimensions of a stylus need to be selected depending on the workpiece. In any case, it is important that a stylus has high rigidity and its tip shape is a practically perfect sphere.



■ Selection of a stylus

It is recommended that a stylus be selected on the basis of the following factors to ensure the high accuracy of measurement.

1. Choose the shortest stylus possible.

The longer a stylus, the more it will flex, and lower accuracy will result. We recommend using the shortest possible stylus for measurement, regardless of the configuration of the stylus.

2. Reduce the number of joints wherever possible.

The combination of styli and use of extensions will increase the possibility flexure. We recommend using as few parts as possible to make up the stylus.

3. Use a ball tip as large as possible.

The use of a larger ball increases the clearance between the ball and stem, thus reducing the possibility of contact between the stem and workpiece (shanking). A larger ball also reduces the influence of the surface finish of a workpiece on measurement accuracy.

■ Stylus materials

Each of our styli use the most appropriate materials for the shaft, ball, and other accessories according to the application. The following introduces the features and benefits of the main materials used.

1. Shaft

To minimize flexure of the stylus, the shaft must be as rigid as possible. Mitutoyo offers products made of the following materials.



■ Carbide

This material provides excellent rigidity for styli with small shaft diameters, thus being optimal for most standard applications. Consideration should be given to the stylus mass in the case of large shaft diameter and long stylus length.



■ Stainless steel

Non-magnetic stainless steel stems offer the best stiffness to mass ratio.



■ Ceramic

Because it is light and has the same level of rigidity as stainless steel, ceramic is mainly used with a stylus with a large ball size and a long axis. It has excellent thermal stability and is not affected by the temperature environment, thereby allowing higher accuracy measurement.



■ Carbon fiber

Carbon fiber is a material appropriate for long styli since the mass of a carbon fiber stylus is approximately 20% of that of a carbide stylus. Thanks to excellent thermal stability, a carbon fiber stylus is little affected by the operating environment.

2. Ball Tip

Selection of the most suitable ball tip material involves taking the measuring procedure and workpiece material into account.



■ Ruby

Ruby has a particularly smooth surface, high compressive strength, and excellent resistance to mechanical corrosion.

Although ruby is the ideal ball material for scanning diverse workpieces, it may cause abrasion during scanning measurement of aluminum and cast iron. When measuring aluminum and cast iron, it is advisable to use other ball materials.



■ Silicon nitride

Silicon nitride, which is similar to ruby, is a ceramic material that provides high hardness and strong resistance to abrasion. Since silicon nitride will not fuse with aluminum, it will not cause adhesive wear like ruby. However, it is recommended that a silicon nitride ball be used only for aluminum workpieces due to a marked susceptibility to abrasion on steel surfaces.



■ Zirconia

Zirconia is a ceramic material that demonstrates a particularly outstanding hardness and has hardness and abrasion characteristics equivalent to a ruby. It is ideal for scanning cast iron parts.



■ Diamond coating

Because it is coated with diamond particles, this ball has excellent durability and wear resistance.

There is none of the adhesive wear that occurs with ruby or silicon nitride balls, and it has a long lifespan, so cleaning and replacing of the stylus are not required as frequently, reducing maintenance effort and costs.

■ Calibration

Even if a stylus appropriate for a workpiece is selected, an accurate measurement result will not be obtained unless the probe to be used is calibrated prior to measurement, which involves probing a master reference sphere in a defined sequence so that the CMM software can establish the ball tip and probe/stylus characteristics.

■ Calibration mechanism

The CMM calculates the center position and diameter of each stylus ball using the specific probe calibration program.

This program uses CMM measurements made of the reference sphere with each configured stylus ball to determine the true diameters of the balls and stores the measured data in the software. The precise diameter of the reference sphere is known from a previous calibration measurement and is also stored for use in the calculations. As a workpiece may be measured from every direction, a stylus is calibrated with measurements at multiple points on the reference sphere. For scanning measurement, a large number of measurement points must be obtained. With these procedures observed, the effective diameter for each stylus ball and the center positions of the stylus balls relative to the machine coordinates are set to enable accurate measurement.

■ Notes on using styli

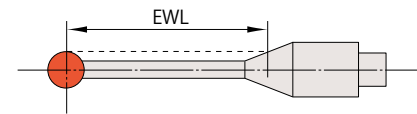
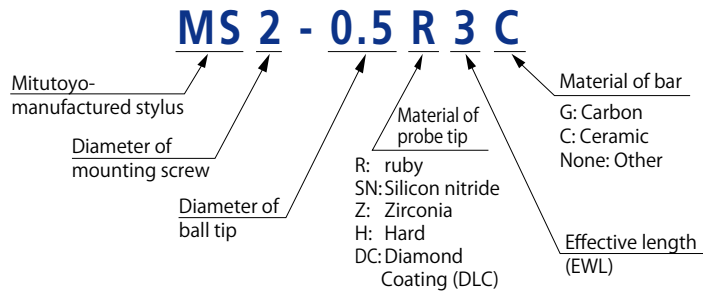
- Inaccuracies can occur depending on the stylus length and mass and the drive speed and acceleration of the probe. Due consideration should be given to the type of probe when setting measuring speed for long and/or heavy styli for scanning measurements.
- A disk stylus consists of the center section of a sphere and is used to measure edges and undercuts on a workpiece. This type of stylus is actually used only for X- and Y-direction measurement due to its shape. It cannot be used for Z-direction measurement. Also, this stylus must be used in conjunction with a stylus changer.
- There are restrictions on the use of a cylinder stylus, again because of its shape.
- For details about restrictions, contact a Mitutoyo sales office.
- Styli are classified in M2 to M5 series, which refers to the fixing thread size of a probe.

The use of a conversion adapter, etc. may allow a stylus with a different thread size to be mounted. In this case, refer to the instruction manual of the probe on which to mount the stylus to select the stylus configuration compatible with the probe specification. Contact your local Mitutoyo sales office if you have any questions about the mounting method.
- The point at which the stylus center and stylus knuckles are fastened will rotate back slightly after probing, due to the impact. When performing high-accuracy measurements, perform repeated measurement with a stable jig, etc. to check the stability of the rotational direction, then re-calibrate before proceeding to measurement, or use a stylus center as a countermeasure (06AHE758 , 06AHE759, 06AHE760).

Product Identification on Styli for CMMs

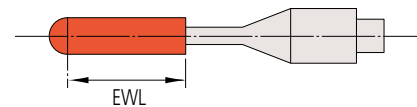
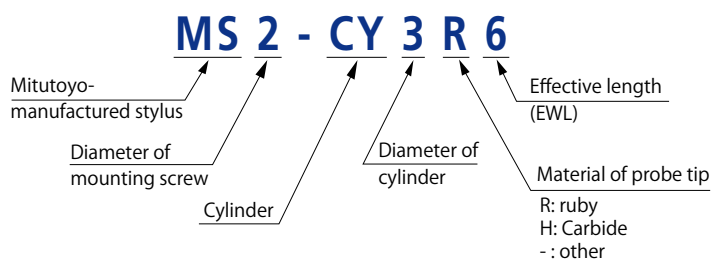
From each Mitutoyo styli the approximate form can be identified (see below).

1 Ball styli

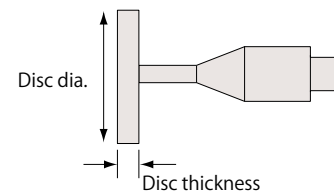
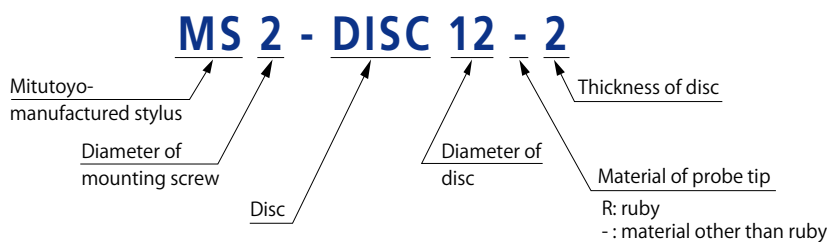


EWL: Effective working length is the distance from the centre of the ball to the point on the stem that is the same diameter as the ball.
 Note: Even if the measuring depth is less than EWL, interference with a workpiece may occur. Use of a stylus with a long EWL or a narrow diameter of EWL may result in greater measurement errors due to flexing caused by the measuring force (force that brings the ball into contact with a workpiece). Always handle a ball stylus with care. If the ball impacts a workpiece too strongly, the stylus may be damaged.

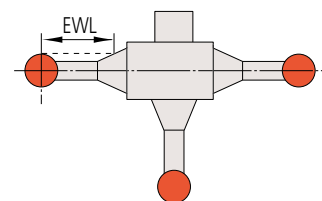
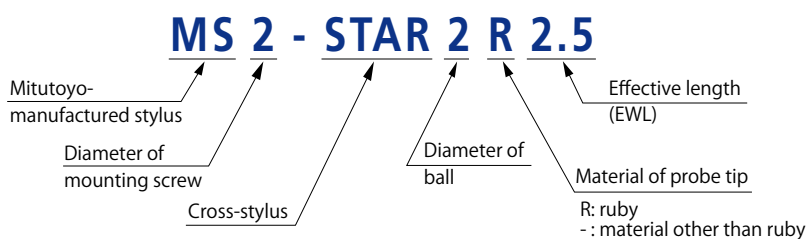
2 Cylindrical styli



3 Disc styli



4 Cross-styli



5 Other accessories

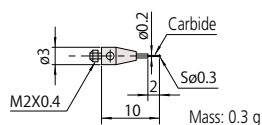
- ① Point stylus
- ② Extension

MS2-PO ("H" will be added when the probe tip is carbide.)

MS2-EXT10 (the figure at the end represents the length. "G" is appended if the bar is carbon fiber, and "C" is appended if the bar is ceramic.)

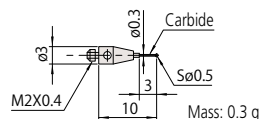
■ Stylus (Mounting Thread M2)

Code No.	06ABN751
Description	MS2-0.3R2
Material of probe tip	Ruby



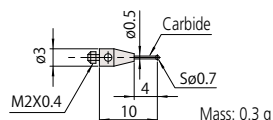
- Use with a measuring force 0.4 N or less.
- Cannot be mounted on TP200.
- This stylus may have a short life compared with normal styli.
- The use of a ceramic master ball (high precision type) S010 mm is recommended.

Code No.	06ABN752	06AFG320	06AFG391
Description	MS2-0.5R3	MS2-0.5SN3	MS2-0.5Z3
Material of probe tip	Ruby	Silicon nitride	Zirconia



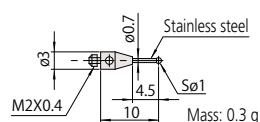
- This stylus may have a short life compared with normal styli.
- Not recommended for mounting on TP200, otherwise an input error may result.
- The use of a ceramic master ball (high precision type) S010 mm is recommended.

Code No.	06ABN753	06AFG392
Description	MS2-0.7R4	MS2-0.7Z4
Material of probe tip	Ruby	Zirconia

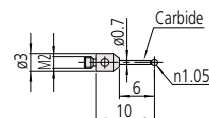


- This stylus may have a short life compared with normal styli.
- The use of a ceramic master ball (high precision type) S010 mm is recommended.

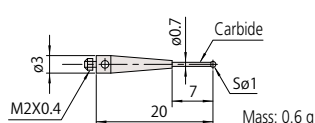
Code No.	06ABN754	06AFG321	06AFG393
Description	MS2-1R4.5	MS2-1SN4.5	MS2-1Z4.5
Material of probe tip	Ruby	Silicon nitride	Zirconia



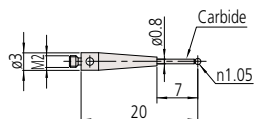
Code No.	06AHK152
Description	MS2-1.05DC6
Material of probe tip	DLC



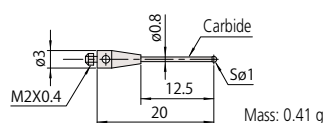
Code No.	06ABN755	06AFG322	06AFG394
Description	MS2-1R7	MS2-1SN7	MS2-1Z7
Material of probe tip	Ruby	Silicon nitride	Zirconia



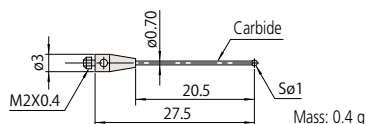
Code No.	06AHK153
Description	MS2-1.05DC7
Material of probe tip	DLC



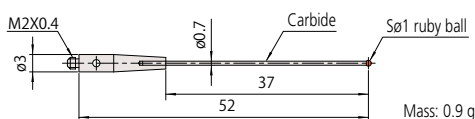
Code No.	06ABN756	06AFG323	06AFG395
Description	MS2-1R12.5	MS2-1SN12.5	MS2-1Z12.5
Material of probe tip	Ruby	Silicon nitride	Zirconia



Code No.	06ABN757	06AFG324	06AFG396
Description	MS2-1R20.5	MS2-1SN20.5	MS2-1Z20.5
Material of probe tip	Ruby	Silicon nitride	Zirconia

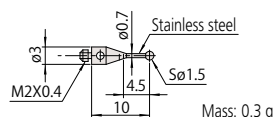


Code No.	06ABF409
Description	MS2-1R37
Material of probe tip	Ruby



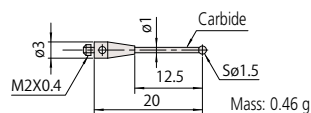
- Cannot be mounted on TP200.* Not recommended for mounting on TP20, otherwise an input error may result.

Code No.	06ABN758	06AFG325	06AFG397
Description	MS2-1.5R4.5	MS2-1.5SN4.5	MS2-1.5Z4.5
Material of probe tip	Ruby	Silicon nitride	Zirconia

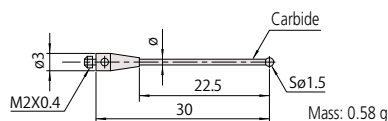


Note: For a stylus longer than 30 mm, select a product with its axis made from carbon fiber or ceramic.

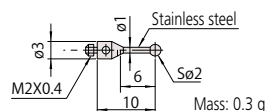
Code No.	06ABN759	06AFG326	06AFG398
Description	MS2-1.5R12.5	MS2-1.5SN12.5	MS2-1.5Z12.5
Material of probe tip	Ruby	Silicon nitride	Zirconia



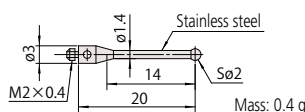
Code No.	06ABN760	06AFG327	06AFG399
Description	MS2-1.5R22.5	MS2-1.5SN22.5	MS2-1.5Z22.5
Material of probe tip	Ruby	Silicon nitride	Zirconia



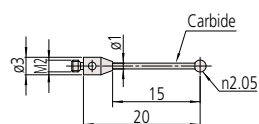
Code No.	06ABN761	06AFG328	06AFG400
Description	MS2-2R6	MS2-2SN6	MS2-2Z6
Material of probe tip	Ruby	Silicon nitride	Zirconia



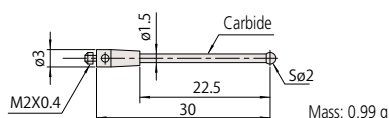
Code No.	06ABN762	06AFG329	06AFG401
Description	MS2-2R14	MS2-2SN14	MS2-2Z14
Material of probe tip	Ruby	Silicon nitride	Zirconia



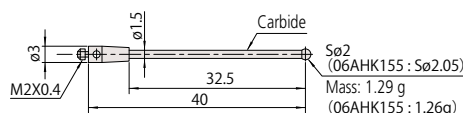
Code No.	06AHK154
Description	MS2-2.05DC15
Material of probe tip	DLC



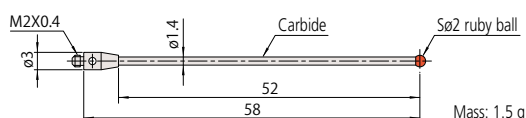
Code No.	06ABN763	06AFG330	06AFG402
Description	MS2-2R22.5	MS2-2SN22.5	MS2-2Z22.5
Material of probe tip	Ruby	Silicon nitride	Zirconia



Code No.	06ABN764	06AFG342	06AFG403	06AHK155
Description	MS2-2R32.5	MS2-2SN32.5	MS2-2Z32.5	MS2-2.05DC32.5
Material of probe tip	Ruby	Silicon nitride	Zirconia	DLC

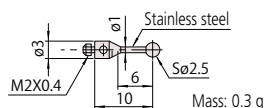


Code No.	06ABF406
Description	MS2-2R52

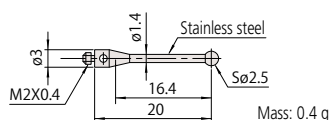


• Cannot be mounted on TP200.
* Not recommended for mounting on TP20, otherwise an input error may result.

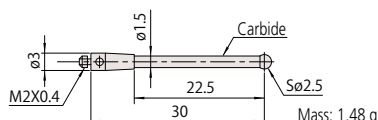
Code No.	06ABN765	06AFG343	06AFG404
Description	MS2-2.5R6	MS2-2.5SN6	MS2-2.5Z6
Material of probe tip	Ruby	Silicon nitride	Zirconia



Code No.	06ABN766	06AFG344	06AFG405
Description	MS2-2.5R16.4	MS2-2.5SN16.4	MS2-2.5Z16.4
Material of probe tip	Ruby	Silicon nitride	Zirconia

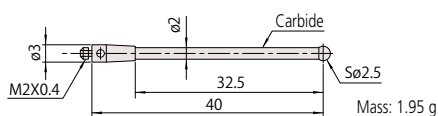


Code No.	06ABN767	06AFG345	06AFG406
Description	MS2-2.5R22.5	MS2-2.5SN22.5	MS2-2.5Z22.5
Material of probe tip	Ruby	Silicon nitride	Zirconia

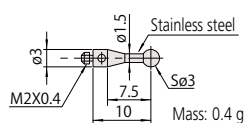


Note: For a stylus longer than 30 mm, select a product with its axis made from carbon fiber or ceramic.

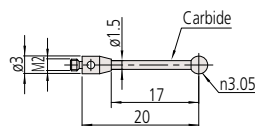
Code No.	06ABN768	06AFG346	06AFG407
Description	MS2-2.5R32.5	MS2-2.5SN32.5	MS2-2.5Z32.5
Material of probe tip	Ruby	Silicon nitride	Zirconia



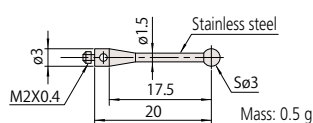
Code No.	06ABN769	06AFG347	06AFG408
Description	MS2-3R7.5	MS2-3SN7.5	MS2-3Z7.5
Material of probe tip	Ruby	Silicon nitride	Zirconia



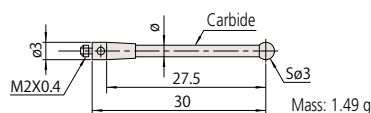
Code No.	06AHK156
Description	MS2-3.05DC17
Material of probe tip	DLC



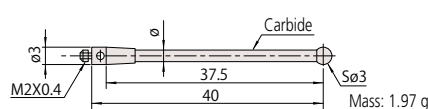
Code No.	06ABN770	06AFG348	06AFG409
Description	MS2-3R17.5	MS2-3SN17.5	MS2-3Z17.5
Material of probe tip	Ruby	Silicon nitride	Zirconia



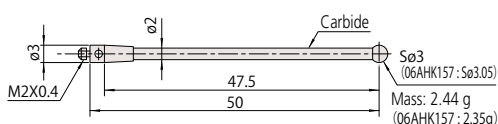
Code No.	06ABN771	06AFG349	06AFG410
Description	MS2-3R27.5	MS2-3SN27.5	MS2-3Z27.5
Material of probe tip	Ruby	Silicon nitride	Zirconia



Code No.	06ABN772	06AFG350	06AFG411
Description	MS2-3R37.5	MS2-3SN37.5	MS2-3Z37.5
Material of probe tip	Ruby	Silicon nitride	Zirconia

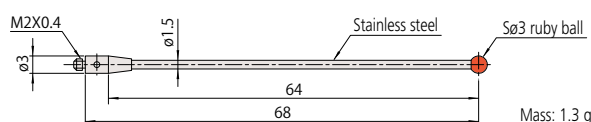


Code No.	06ABN773	06AFG351	06AFG412	06AHK157
Description	MS2-3R47.5	MS2-3SN47.5	MS2-3Z47.5	MS2-3.05DC47.5
Material of probe tip	Ruby	Silicon nitride	Zirconia	DLC



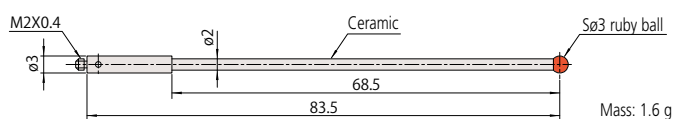
• Not recommended for mounting on TP20, otherwise an input error may result.

Code No.	06ABF402
Description	MS2-3R64



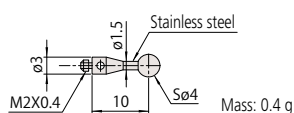
• Not recommended for mounting on TP20, otherwise an input error may result.

Code No.	06ABF405
Description	MS2-3R68.5C

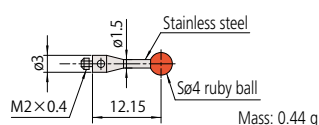


• Cannot be mounted on TP200.
* Not recommended for mounting on TP20, otherwise an input error may result.

Code No.	06ABN774	06AFG352	06AFG413
Description	MS2-4R10	MS2-4SN10	MS2-4Z10
Material of probe tip	Ruby	Silicon nitride	Zirconia

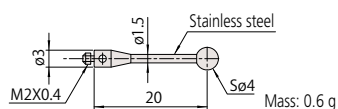


Code No.	06AFZ463
Description	MS2-4R12.15

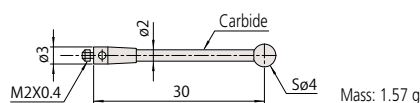


Note: For a stylus longer than 30 mm, select a product with its axis made from carbon fiber or ceramic.

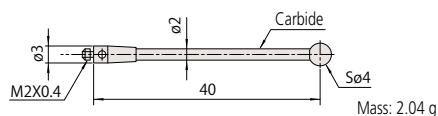
Code No.	06ABN775	06AFG353	06AFG414
Description	MS2-4R20	MS2-4SN20	MS2-4Z20
Material of probe tip	Ruby	Silicon nitride	Zirconia



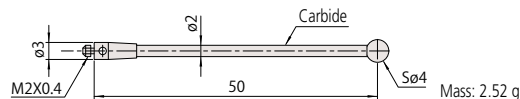
Code No.	06ABN776	06AFG354	06AFG415
Description	MS2-4R30	MS2-4SN30	MS2-4Z30
Material of probe tip	Ruby	Silicon nitride	Zirconia



Code No.	06ABN777	06AFG355	06AFG416
Description	MS2-4R40	MS2-4SN40	MS2-4Z40
Material of probe tip	Ruby	Silicon nitride	Zirconia

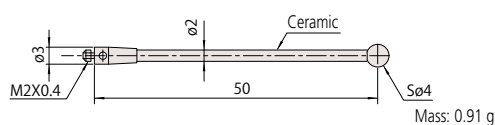


Code No.	06ABN778	06AFG356	06AFG417
Description	MS2-4R50	MS2-4SN50	MS2-4Z50
Material of probe tip	Ruby	Silicon nitride	Zirconia

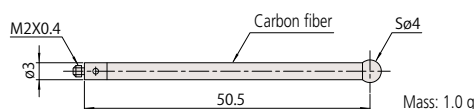


• Not recommended for mounting on TP 20, otherwise an input error may result.

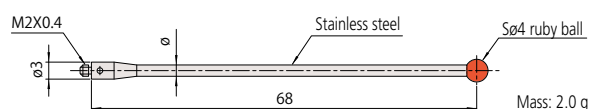
Code No.	06ABN779	06AFG357	06AFG418
Description	MS2-4R50C	MS2-4SN50C	MS2-4Z50C
Material of probe tip	Ruby	Silicon nitride	Zirconia



Code No.	06ABQ341	06AFG358	06AFG419
Description	MS2-4R50.5G	MS2-4SN50.5G	MS2-4Z50.5G
Material of probe tip	Ruby	Silicon nitride	Zirconia

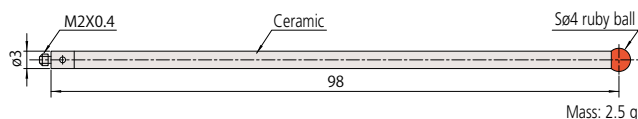


Code No.	06ABF404
Description	MS2-4R68



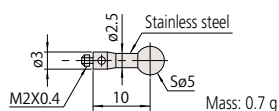
• Not recommended for mounting on TP 20, otherwise an input error may result.

Code No.	06ABF410
Description	MS2-4R98C

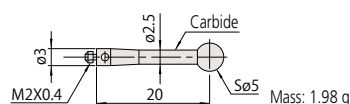


• Cannot be mounted on TP200.
Not recommended for mounting on TP20, otherwise an input error may result.

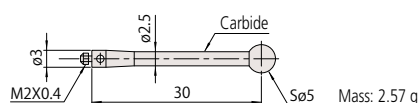
Code No.	06ABN780	06AFG359	06AFG420
Description	MS2-5R10	MS2-5SN10	MS2-5Z10
Material of probe tip	Ruby	Silicon nitride	Zirconia



Code No.	06ABN781	06AFG360	06AFG421
Description	MS2-5R20	MS2-5SN20	MS2-5Z20
Material of probe tip	Ruby	Silicon nitride	Zirconia

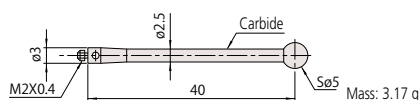


Code No.	06ABN782	06AFG361	06AFG422
Description	MS2-5R30	MS2-5SN30	MS2-5Z30
Material of probe tip	Ruby	Silicon nitride	Zirconia

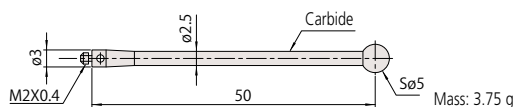


Note: For a stylus longer than 30 mm, select a product with its axis made from carbon fiber or ceramic.

Code No.	06ABN783	06AFG362	06AFG423
Description	MS2-5R40	MS2-5SN40	MS2-5Z40
Material of probe tip	Ruby	Silicon nitride	Zirconia

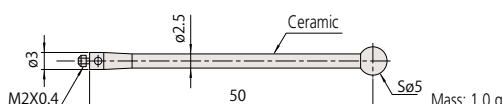


Code No.	06ABN784	06AFG363	06AFG424
Description	MS2-5R50	MS2-5SN50	MS2-5Z50
Material of probe tip	Ruby	Silicon nitride	Zirconia

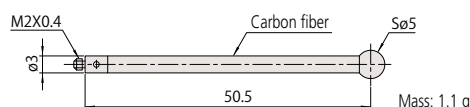


• Not recommended for mounting on TP20, otherwise an input error may result.

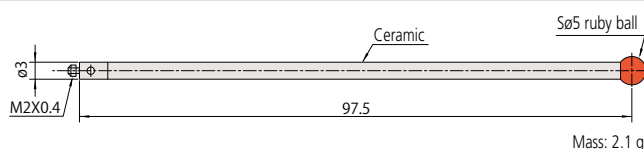
Code No.	06ABN785	06AFG364	06AFG425
Description	MS2-5R50C	MS2-5SN50C	MS2-5Z50C
Material of probe tip	Ruby	Silicon nitride	Zirconia



Code No.	06ABQ342	06AFG365	06AFG426
Description	MS2-5R50.5G	MS2-5SN50.5G	MS2-5Z50.5G
Material of probe tip	Ruby	Silicon nitride	Zirconia

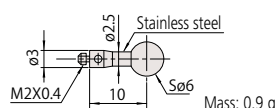


Code No.	06ABF411
Description	MS2-5R97.5C

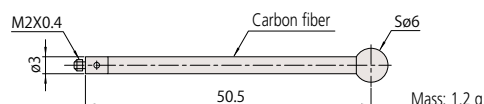


• Cannot be mounted on TP200. Not recommended for mounting on TP20, otherwise an input error may result.

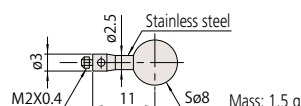
Code No.	06ABN786	06AFG366	06AFG427
Description	MS2-6R10	MS2-6SN10	MS2-6Z10
Material of probe tip	Ruby	Silicon nitride	Zirconia



Code No.	06ABN787	06AFG367	06AFG428
Description	MS2-6R50.5G	MS2-6SN50.5G	MS2-6Z50.5G
Material of probe tip	Ruby	Silicon nitride	Zirconia



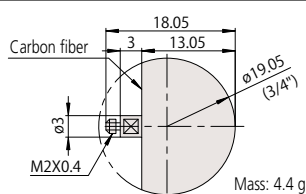
Code No.	06ABN788	06AFG368	06AFG429
Description	MS2-8R11	MS2-8SN11	MS2-8Z11
Material of probe tip	Ruby	Silicon nitride	Zirconia



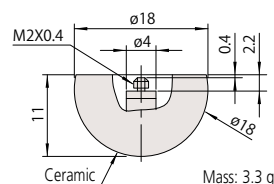
Note: For a stylus longer than 30 mm, select a product with its axis made from carbon fiber or ceramic.

■ Stylus (Mounting thread M2)

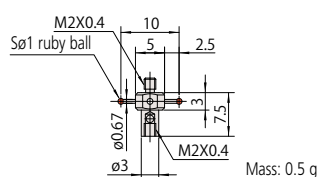
Code No.	135399
Description	MS2-19.05C 3/4inch



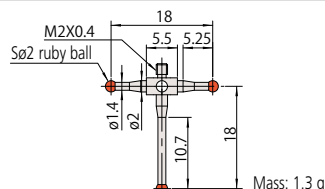
Code No.	160225
Description	MS2-18C



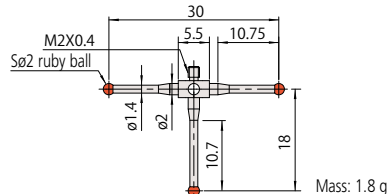
Code No.	06ABN795
Description	MS2-STAR1R2.5



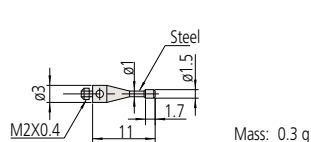
Code No.	06ABN796
Description	MS2-STAR2R5.25



Code No.	06ABN797
Description	MS2-STAR2R10.75

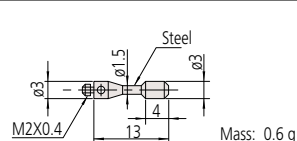


Code No.	06ABN789
Description	MS2-CY1.5-1.7



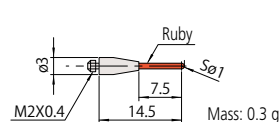
•There are some restrictions on use. Please contact your local Mitutoyo sales office.

Code No.	06ABN790
Description	MS2-CY3-4



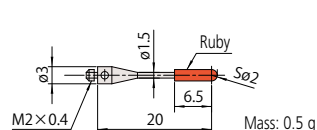
•There are some restrictions on use. Please contact your local Mitutoyo sales office.

Code No.	06ABN791
Description	MS2-CY1R7.5



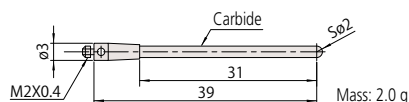
•There are some restrictions on use. Please contact your local Mitutoyo sales office.

Code No.	06ABN792
Description	MS2-CY2R6.5



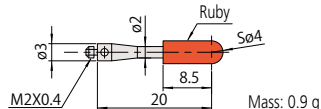
•There are some restrictions on use. Please contact your local Mitutoyo sales office.

Code No.	06ABN793
Description	MS2-CY2H31



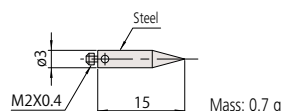
•Cannot be mounted on TP200.*
•There are some restrictions on use. Please contact your local Mitutoyo sales office.

Code No.	06ABN794
Description	MS2-CY4R8.5

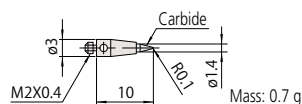


•There are some restrictions on use. Please contact your local Mitutoyo sales office.

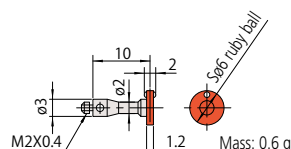
Code No.	06ABN799
Description	MS2-PO



Code No.	06ABN800
Description	MS2-PO-H

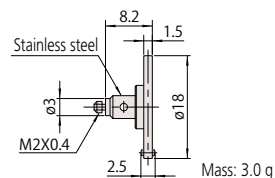


Code No.	160214
Description	MS2-DISC6R-2



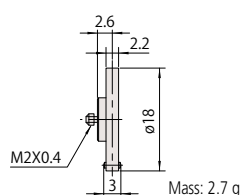
•There are some restrictions on use. Please contact your local Mitutoyo sales office.

Code No.	06AAL516
Description	MS2-DISC18-2.5



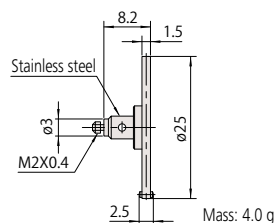
•There are some restrictions on use. Please contact your local Mitutoyo sales office.

Code No.	160215
Description	MS2-DISC18-3



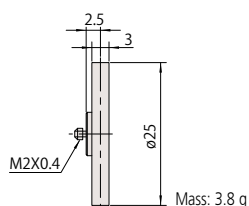
•There are some restrictions on use. Please contact your local Mitutoyo sales office.

Code No.	06AAL517
Description	MS2-DISC25-2.5



•There are some restrictions on use. Please contact your local Mitutoyo sales office.

Code No.	160226
Description	MS2-DISC25-3

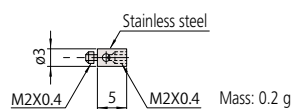


•There are some restrictions on use. Please contact your local Mitutoyo sales office.

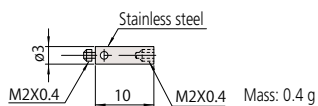
* For a stylus longer than 30 mm, select a product with its axis made from carbon fiber or ceramic.

■ Stylus (Mounting thread M2)

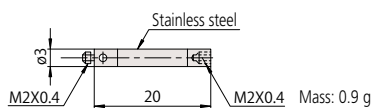
Code No.	06ABP853
Description	MS2-EXT5



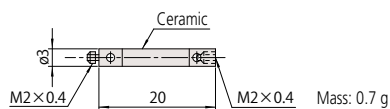
Code No.	06ABN804
Description	MS2-EXT10



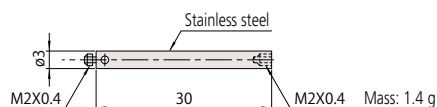
Code No.	06ABN805
Description	MS2-EXT20



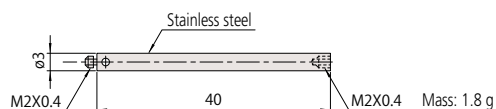
Code No.	908884
Description	MS2-EXT20C



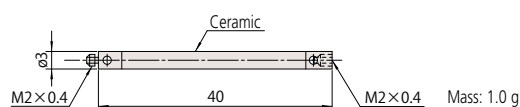
Code No.	06ABN806
Description	MS2-EXT30



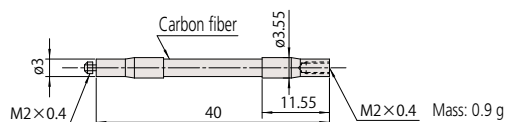
Code No.	06ABN807
Description	MS2-EXT40



Code No.	908885
Description	MS2-EXT40C

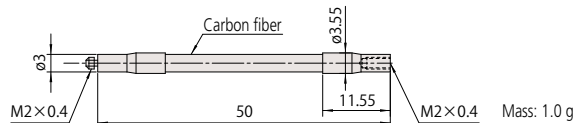


Code No.	06AAL257
Description	MS2-EXT40G

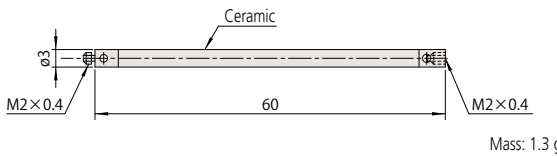
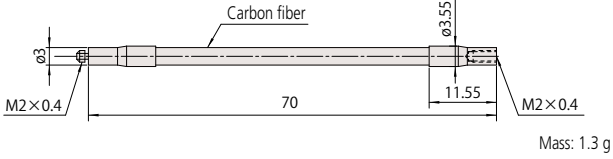
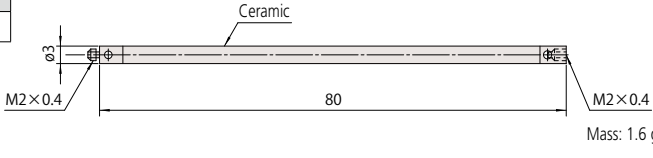
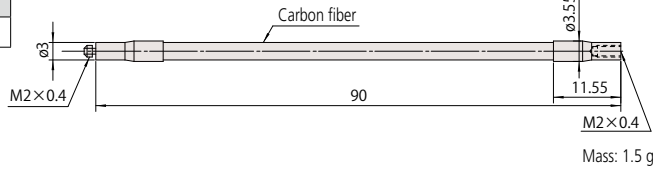
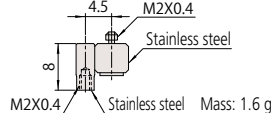
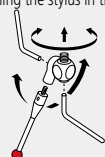
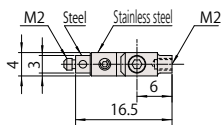
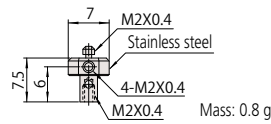
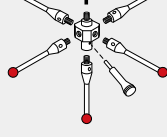
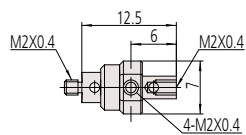
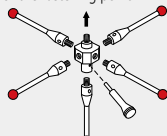
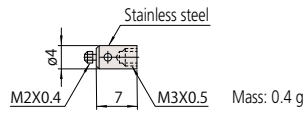


- For TP200
- For mounting stylus, attachment tools for carbon extension is required.

Code No.	06AAL258
Description	MS2-EXT50G

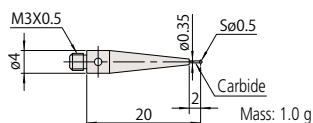


- For TP200
- For mounting stylus, attachment tools for carbon extension is required.

Code No.	908886	 Mass: 1.3 g	
Description	MS2-EXT60C		
Code No.	06ABN809	 Mass: 1.3 g	• Not recommended for mounting on TP200, otherwise an input error may result. • Also for other probes it is recommended to use in the vertical direction. Otherwise an input error may result depending on the drive speed or acceleration. • For mounting stylus, attachment tools for carbon extension is required. (refer to page 62)
Description	MS2-EXT70G		
Code No.	908887	 Mass: 1.6 g	
Description	MS2-EXT80C		
Code No.	06ABN810	 Mass: 1.5 g	
Description	MS2-EXT90G		
Code No.	153142	 Mass: 1.6 g	• Adapter for turning the stylus in the desired direction. 
Description	MS2-stylus knuckle		
Code No.	06AFA210	 Mass: 1.6 g	• Adapter for turning the stylus in the desired direction. 
Description	MS2-stylus knuckle rotary		
Code No.	06ABN812	 Mass: 0.8 g	• Adapter for mounting the stylus in one of the five directions. 
Description	MS2-stylus center		
Code No.	06AHE758	 Mass: 0.8 g	• Adapter for mounting the stylus in one of the five directions. • The structure suppresses returning rotational movement of the fastening point. 
Description	MS2-stylus center-S		
Code No.	06ABN813	 Mass: 0.4 g	• This is an adapter for a probe, whose stylus attachment section is threaded to M2, to accept M3-threaded stylus. 
Description	MS2-M3 female-adapter		

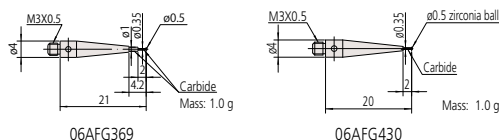
■ Stylus (Mounting thread dia.: M3)

Code No.	06ABN816
Description	MS3-0.5R2
Material of probe tip	Ruby



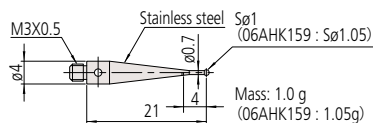
- Use with a measuring force 0.4 N or less.
- The use of a ceramic master ball (high precision type) $\phi 10$ mm is recommended.

Code No.	06AFG369	06AFG430
Description	MS3-0.5SN2	MS3-0.5Z2
Material of probe tip	Silicon nitride	Zirconia

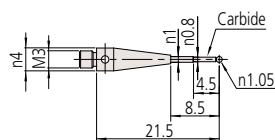


- Use with a measuring force 0.4 N or less.
- The use of a ceramic master ball (high precision type) $\phi 10$ mm is recommended.

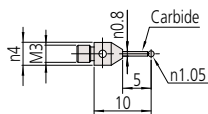
Code No.	06ABN817	06AFG370	06AFG431	06AHK159
Description	MS3-1R4	MS3-1SN4	MS3-1Z4	MS3-1.05DC4
Material of probe tip	Ruby	Silicon nitride	Zirconia	DLC



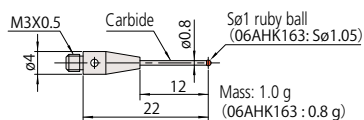
Code No.	06AHK161
Description	MS3-1.05DC4.5
Material of probe tip	DLC



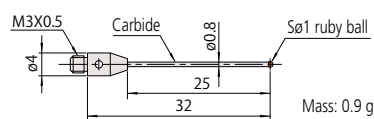
Code No.	06AHK162
Description	MS3-1.05DC5
Material of probe tip	DLC



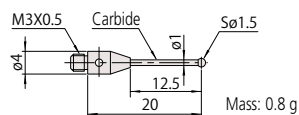
Code No.	06ABF414	06AHK163
Description	MS3-1R12	MS3-1.05DC12
Material of probe tip	Ruby	DLC



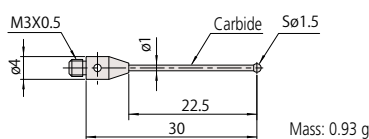
Code No.	06ABF412
Description	MS3-1R25



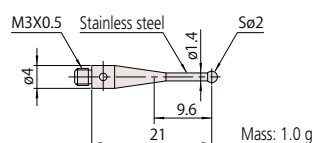
Code No.	06ABN818	06AFG371	06AFG432
Description	MS3-1.5R12.5	MS3-1.5SN12.5	MS3-1.5Z12.5
Material of probe tip	Ruby	Silicon nitride	Zirconia



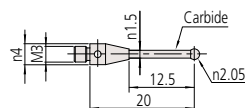
Code No.	06ABN819	06AFG372	06AFG433
Description	MS3-1.5R22.5	MS3-1.5SN22.5	MS3-1.5Z22.5
Material of probe tip	Ruby	Silicon nitride	Zirconia



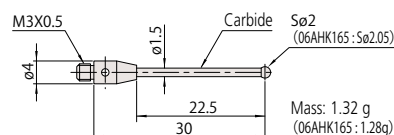
Code No.	06ABN820	06AFG373	06AFG434
Description	MS3-2R9.6	MS3-2SN9.6	MS3-2Z9.6
Material of probe tip	Ruby	Silicon nitride	Zirconia



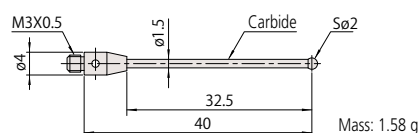
Code No.	06AHK164
Description	MS3-2.05DC12.5
Material of probe tip	DLC



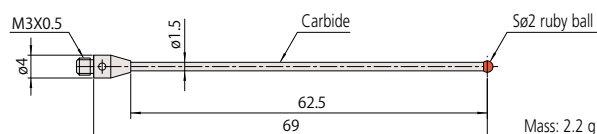
Code No.	06ABN821	06AFG374	06AFG435	06AHK165
Description	MS3-2R22.5	MS3-2SN22.5	MS3-2Z22.5	MS3-2.05DC22.5
Material of probe tip	Ruby	Silicon nitride	Zirconia	DLC



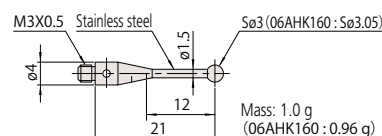
Code No.	06ABN822	06AFG375	06AFG436
Description	MS3-2R32.5	MS3-2SN32.5	MS3-2Z32.5
Material of probe tip	Ruby	Silicon nitride	Zirconia



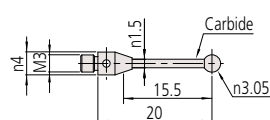
Code No.	06ABF416
Description	MS3-2R62.5



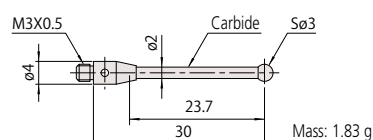
Code No.	06ABN823	06AFG376	06AFG437	06AHK160
Description	MS3-3R12	MS3-3SN12	MS3-3Z12	MS3-3.05DC12
Material of probe tip	Ruby	Silicon nitride	Zirconia	DLC



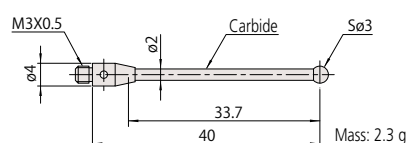
Code No.	06AHK166
Description	MS3-3.05DC15.5
Material of probe tip	DLC



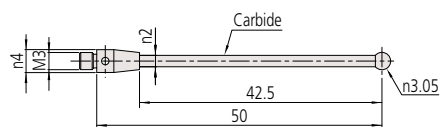
Code No.	06ABN824	06AFG377	06AFG438
Description	MS3-3R23.7	MS3-3SN23.7	MS3-3Z23.7
Material of probe tip	Ruby	Silicon nitride	Zirconia



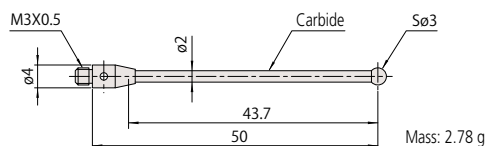
Code No.	06ABN825	06AFG378	06AFG439
Description	MS3-3R33.7	MS3-3SN33.7	MS3-3Z33.7
Material of probe tip	Ruby	Silicon nitride	Zirconia



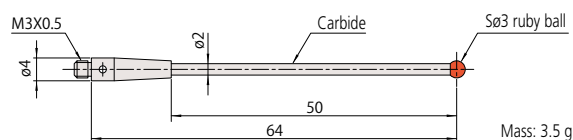
Code No.	06AHK167
Description	MS3-3.05DC42.5
Material of probe tip	DLC



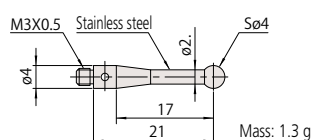
Code No.	06ABN826	06AFG379	06AFG440
Description	MS3-3R43.7	MS3-3SN43.7	MS3-3Z43.7
Material of probe tip	Ruby	Silicon nitride	Zirconia



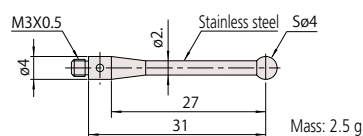
Code No.	06ABF415
Description	MS3-3R50



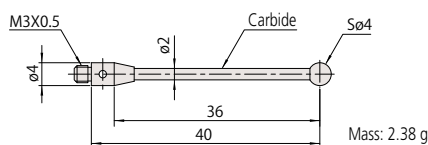
Code No.	06ABN827	06AFG380	06AFG441
Description	MS3-4R17	MS3-4SN17	MS3-4Z17
Material of probe tip	Ruby	Silicon nitride	Zirconia



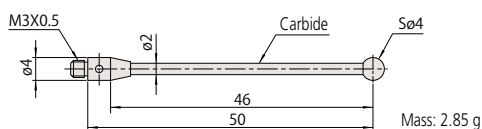
Code No.	06ABN828	06AFG381	06AFG442
Description	MS3-4R27	MS3-4SN27	MS3-4Z27
Material of probe tip	Ruby	Silicon nitride	Zirconia



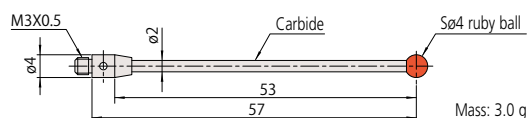
Code No.	06ABN829	06AFG382	06AFG443
Description	MS3-4R36	MS3-4SN36	MS3-4Z36
Material of probe tip	Ruby	Silicon nitride	Zirconia



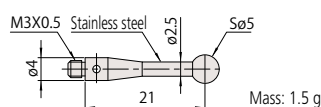
Code No.	06ABN830	06AFG383	06AFG444
Description	MS3-4R46	MS3-4SN46	MS3-4Z46
Material of probe tip	Ruby	Silicon nitride	Zirconia



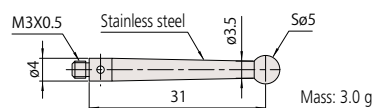
Code No.	06ABF403
Description	MS3-4R53



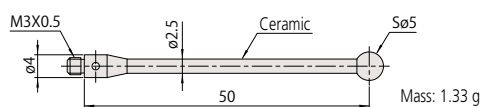
Code No.	06ABN831	06AFG384	06AFG445
Description	MS3-5R21	MS3-5SN21	MS3-5Z21
Material of probe tip	Ruby	Silicon nitride	Zirconia



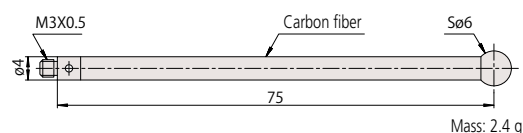
Code No.	163874	06AFG385	06AFG446
Description	MS3-5R31	MS3-5SN31	MS3-5Z31
Material of probe tip	Ruby	Silicon nitride	Zirconia



Code No.	06ABN832	06AFG386	06AFG447
Description	MS3-5R50C	MS3-5SN50C	MS3-5Z50C
Material of probe tip	Ruby	Silicon nitride	Zirconia

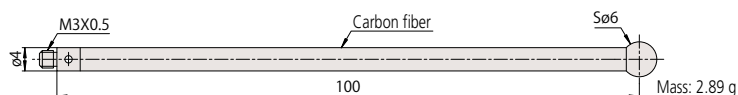


Code No.	06ABS911	06AFG387	06AFG448
Description	MS3-6R75G	MS3-6SN75G	MS3-6Z75G
Material of probe tip	Ruby	Silicon nitride	Zirconia



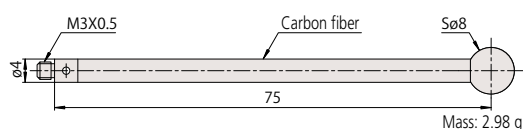
- For SP25M
- SM25-2 or SM25-3 is required for use with SP25M.
- For the applicable length for each P25M module, refer to the specifications for SP25M (page 8).

Code No.	06ABS912	06AFG388	06AFG449
Description	MS3-6R100G	MS3-6SN100G	MS3-6Z100G
Material of probe tip	Ruby	Silicon nitride	Zirconia



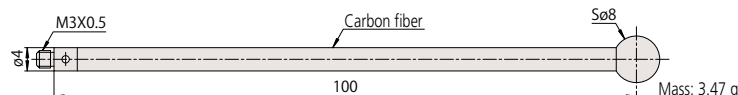
- For SP25M
- SM25-3 is required for use with SP25M.
- For the applicable length for each P25M module, refer to the specifications for SP25M (page 8).

Code No.	06ABS913	06AFG389	06AFG450
Description	MS3-8R75G	MS3-8SN75G	MS3-8Z75G
Material of probe tip	Ruby	Silicon nitride	Zirconia



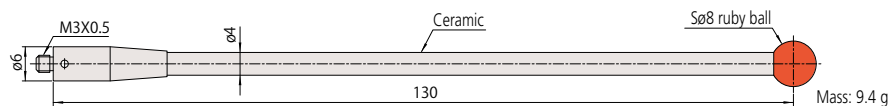
- For SP25M
- SM25-3 or SM25-3 is required for use with SP25M.
- For the applicable length for each P25M module, refer to the specifications for SP25M (page 8).

Code No.	06ABS914	06AFG390	06AFG451
Description	MS3-8R100G	MS3-8SN100G	MS3-8Z100G
Material of probe tip	Ruby	Silicon nitride	Zirconia



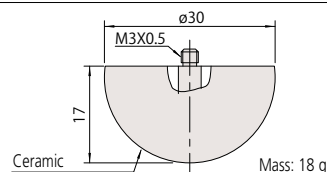
- For SP25M
- SM25-3 is required for use with SP25M.
- For the applicable length for each P25M module, refer to the specifications for SP25M (page 8).

Code No.	06ABF407	Description	MS3-8R130C
----------	----------	-------------	------------



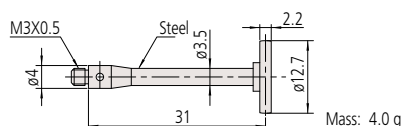
- Cannot be mounted on the old scanning probe models including MPP-2, MPP-2H, and MPP-5.
- Strongly recommended to use in the vertical position for touch-trigger probes. Otherwise an input error may result depending on the drive speed or acceleration.

Code No.	916492
Description	MS3-30C



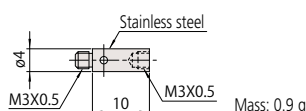
- Cannot be mounted on SP25M.

Code No.	169011
Description	MS3-DISC 12.7-2



- The use may be restricted depending on the application. Please contact your local Mitutoyo sales office.

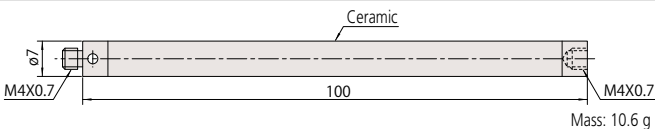
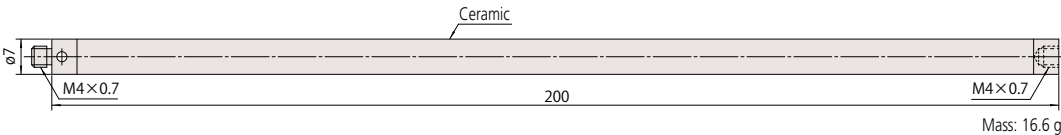
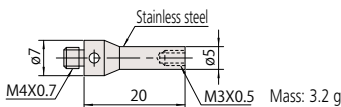
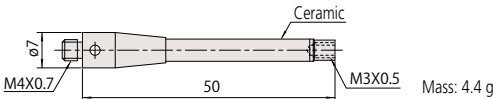
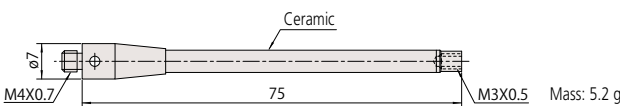
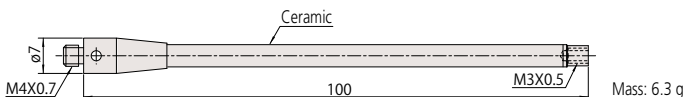
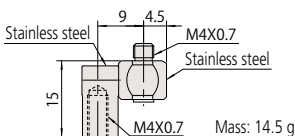
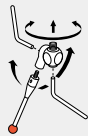
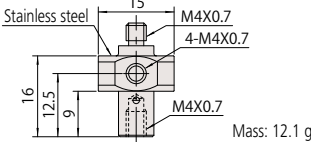
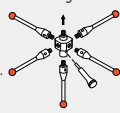
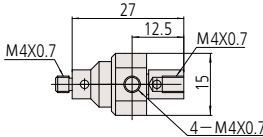
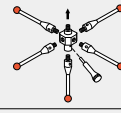
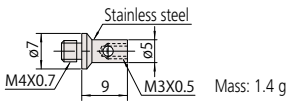
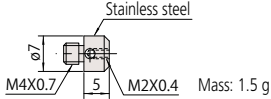
Code No.	06ABN833
Description	MS3-EXT10



Code No.	06ABN834		
Description	MS3-EXT20		
Code No.	06ABN835		
Description	MS3-EXT35		
Code No.	06ABN836		
Description	MS3-EXT50C		
Code No.	06ABS915		- For SP25M - SM25-3 is required for use with SP25M. - For the applicable length for each P25M module, refer to the specifications for SP25M (page 8).
Description	MS3-EXT75G		
Code No.	06ABS916		- For SP25M - SM25-3 is required for use with SP25M. - For the applicable length for each P25M module, refer to the specifications for SP25M (page 8).
Description	MS3-EXT100G		
Code No.	06ABN838		Adapter for turning the stylus in the desired direction.
Description	MS3-stylus knuckle		
Code No.	06ABN839		Adapter for mounting the stylus in one of the five directions.
Description	MS3-stylus center		
Code No.	06AHE759		- Adapter for mounting the stylus in one of the five directions. - The structure suppresses returning rotational movement of the fastening point.
Description	MS3-stylus center-S		
Code No.	06ABN837		This is an adapter for a probe, whose stylus attachment section is threaded to M3, to accept M2-threaded stylus.
Description	MS3-M2 female-adapter		
Code No.	167234		This is an adapter for a probe, whose stylus attachment section is threaded to M3, to accept straight-shank type stylus.
Description	MS3-4.5-adapter		

■ Stylus (Mounting thread M4)

Code No.	06ABN840		
Description	MS4-1R4.5		
Code No.	06ABN841		
Description	MS4-2R8		
Code No.	06ABN842		
Description	MS4-4R13.5		
Code No.	06ABQ149		
Description	MS4-4R33C		
Code No.	06ABN843		
Description	MS4-8R50C		
Code No.	06ABN844		
Description	MS4-8R100C		
Code No.	06ABN845		
Description	MS4-6R88G		
Code No.	06ABN846		
Description	MS4-6R138G		
Code No.	06ABN847		*Cannot be mounted on SP25M.
Description	MS4-6R188G		
Code No.	06ABN848		
Description	MS4-EXT30C		
Code No.	06ABN849		
Description	MS4-EXT50C		

Code No.	06ABN850		
Description	MS4-EXT100C		
Code No.	06AAD457		
Description	MS4-EXT200C		
Code No.	06ABN851		
Description	MS4-M3EXT20		
Code No.	06ABN852		
Description	MS4-M3EXT50C		
Code No.	06ABN853		
Description	MS4-M3EXT75C		
Code No.	06ABN854		
Description	MS4-M3EXT100C		
Code No.	06AAD460		• Adapter for turning the stylus in the desired direction. 
Description	MS4-stylus knuckle		
Code No.	06ABN857		• Adapter for mounting the stylus in one of the five directions. 
Description	MS4-stylus center		
Code No.	06AHE760		• Adapter for mounting the stylus in one of the five directions. • The structure suppresses returning rotational movement of the fastening point. 
Description	MS4-stylus center-S		
Code No.	06ABN855		• This is an adapter for a probe, whose stylus attachment section is threaded to M4, accept M3-threaded stylus. 
Description	MS4-M3 female-adapter		
Code No.	06ABN856		• This is an adapter for a probe, whose stylus attachment section is threaded to M4, accept M2-threaded stylus. 
Description	MS4-M2 female-adapter		

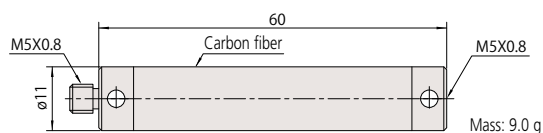
■ Stylus (Mounting thread M5)

Code No.	06ABS917		
Description	MS5-0.5R4		
Code No.	06ABS918		
Description	MS5-0.7R5		
Code No.	06ABS920		
Description	MS5-1R5		
Code No.	06ABS921		
Description	MS5-1.5R11		
Code No.	06ABS923		
Description	MS5-2R11		
Code No.	06ABS924		
Description	MS5-2R21		
Code No.	06ABS925		
Description	MS5-2R31		
Code No.	06ABS926		
Description	MS5-2.5R31		
Code No.	06ABS927		
Description	MS5-2.5R41		
Code No.	06ABS928		
Description	MS5-3R11		
Code No.	06ABS929		
Description	MS5-3R21		
Code No.	06ABS930		
Description	MS5-3R31		
Code No.	06ABS931		
Description	MS5-3R41		

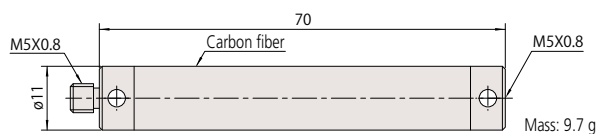
Code No.	06ABS932		
Description	MS5-3R55		
Code No.	06ABS933		
Description	MS5-4R11		
Code No.	06ABS934		
Description	MS5-4R21		
Code No.	06ABS935		
Description	MS5-4R41		
Code No.	06ABS936		
Description	MS5-4R50		
Code No.	06ABS937		
Description	MS5-4R65		
Code No.	06ABS938		
Description	MS5-5R11		
Code No.	06ABS939		
Description	MS5-5R21		
Code No.	06ABS940		
Description	MS5-5R41		
Code No.	06ABS941		
Description	MS5-5R50		
Code No.	06ABS942		
Description	MS5-5R65		
Code No.	06ABS943		
Description	MS5-5R91		
Code No.	06ABS944		
Description	MS5-6R39G		

Code No.	06ABS945		
Description	MS5-6R64G		
Code No.	06ABS946		
Description	MS5-6R89G		
Code No.	06ABS947		
Description	MS5-8R37G		
Code No.	06ABU673		
Description	MS5-8R38C		
Code No.	06ABS948		
Description	MS5-8R62G		
Code No.	06ABS949		
Description	MS5-8R87G		
Code No.	06ABS950		
Description	MS5-10R37G		
Code No.	06ABS951		
Description	MS5-10R62G		
Code No.	06ABS952		
Description	MS5-10R87G		
Code No.	06ABS953		
Description	MS5-16C		
Code No.	06ABS954		
Description	MS5-22C		
Code No.	06ABS955		
Description	MS5-EXT40G		
Code No.	06ABS956		
Description	MS5-EXT50G		

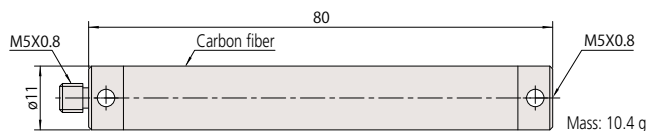
Code No.	06ABS957
Description	MS5-EXT60G



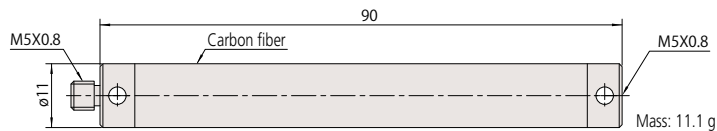
Code No.	06ABS958
Description	MS5-EXT70G



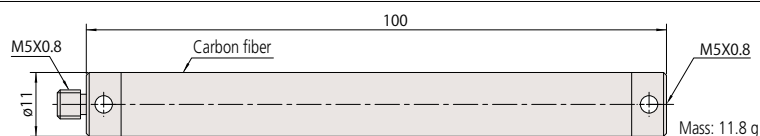
Code No.	06ABS959
Description	MS5-EXT80G



Code No.	06ABS960
Description	MS5-EXT90G



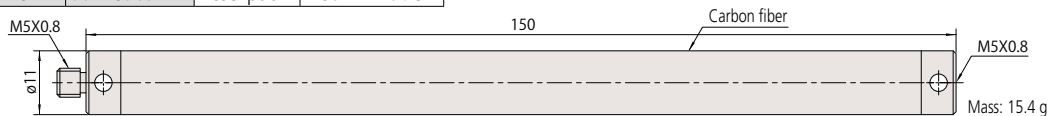
Code No.	06ABS961
Description	MS5-EXT100G



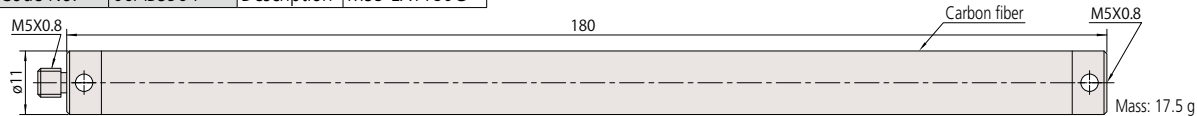
Code No.	06ABS962
Description	MS5-EXT120G



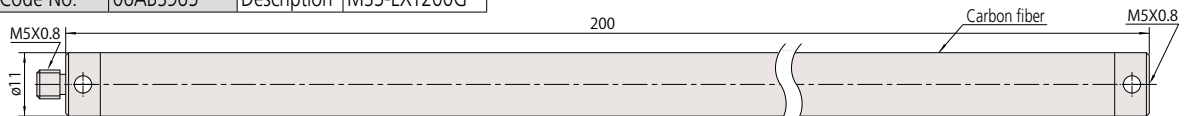
Code No.	06ABS963	Description	MS5-EXT150G
----------	----------	-------------	-------------



Code No.	06ABS964	Description	MS5-EXT180G
----------	----------	-------------	-------------



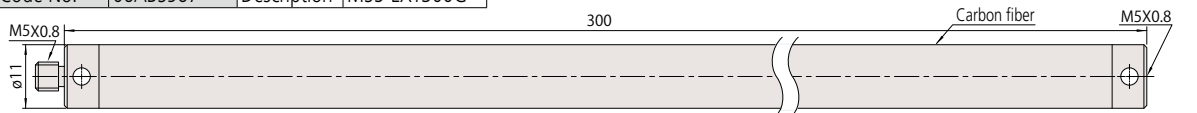
Code No.	06ABS965	Description	MS5-EXT200G
----------	----------	-------------	-------------



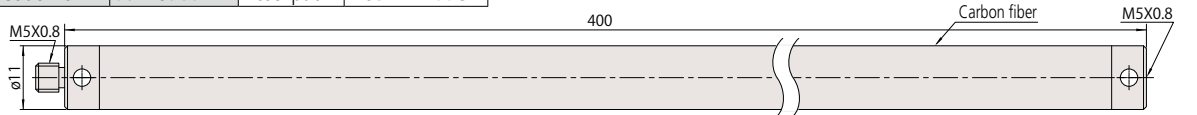
Code No.	06ABS966	Description	MS5-EXT250G
----------	----------	-------------	-------------



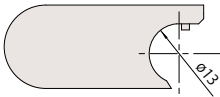
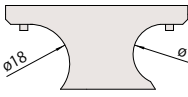
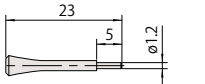
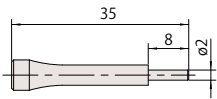
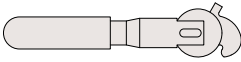
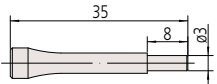
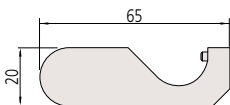
Code No.	06ABS967	Description	MS5-EXT300G
----------	----------	-------------	-------------



Code No.	06ABS968	Description	MS5-EXT400G
----------	----------	-------------	-------------



■ Attachment Tools

Code No.	161534		Mass: 5.0 g	• Attachment tool for probes with the body diameter of $\phi 13$ mm and probe extensions.
Description	Single-ended wrench			
Code No.	161535		Mass: 5.0 g	• Attachment tool for probes with the body diameter of $\phi 13$ mm or 18 mm and probe extensions.
Description	Double-ended wrench			
Code No.	153140		Mass: 0.7 g	• Stylus attachment/detachment tool for M2 and M3 mounting screws.
Description	M2-stylus tool			
Code No.	181279		Mass: 3.5 g	• Stylus attachment/detachment tool for M4 mounting screws.
Description	M4-stylus tool			
Code No.	06AAL264		Mass: 20.0 g	• Attachment/detachment tool for carbon-fiber extensions whose mounting thread is M2.
Description	Attachment tool for carbon-fiber extensions			
Code No.	06ACS890		Mass: 3.7 g	
Description	M5-stylus tool			
Code No.	06AHA636		Mass: 38 g	
Description	M5-extension tool			

■ Stylus Set [Code No. 06ABT114]

Ref. No.	Description	Specifications	Qty	Remarks
1	MS4-1R4.5-S	$\phi 1 \times 20$ mm (M4)	2	High-accuracy specifications
2	MS4-2R8-S	$\phi 2 \times 20$ mm (M4)	2	High-accuracy specifications
3	MS4-4R13.5-S	$\phi 4 \times 20$ mm (M4)	2	High-accuracy specifications
4	MS4-4R33-S	$\phi 4 \times 50$ mm (M4)	1	High-accuracy specifications
5	MS4-8R50C-S	$\phi 8 \times 50$ mm (M4)	1	High-accuracy specifications
6	MS4-8R100C-S	$\phi 8 \times 100$ mm (M4)	1	High-accuracy specifications
7	MS3-30C	$\phi 30$ Ceramic ball (M3)	1	
8	MS4-EXT50C	L50 Extension (M4-M4)	2	
9	MS4-EXT30C	L30 Extension (M4-M4)	1	
10	MS4-M3EXT20	L20 Extension (M4-M4)	1	
11	MS4-M3EXT75C	L75 Extension (M4-M3)	1	
12	MS4-stylus center	M4 Stylus center	1	
13	MS3-stylus center	M3 Stylus center	1	
14	MS2-stylus center	M2 Stylus center	1	
15	MS4-stylus tool	M4 Stylus tool	2	
16	MS2-stylus tool	M2, M3 Stylus tool	2	
17	MS4-M3 female-adaptor	M4-M3 adaptor (L9)	2	
18	MS3-M2 female-adaptor	M3-M2 adaptor (L5)	5	
19	Storage box		1	

Note: Some items cannot be ordered separately.
• For other necessary styli, select from the styli list.
• For probe extensions, refer to **PH10M/PH10MQ**.



■ Stylus Set

■ Set No. 06AGG825*



Description	ø (mm)	L (mm)	Qty
Stylus CF-ruby M2	4	50	5
Stylus tungsten M3	3	40	1
Stylus tungsten M2	2	30	2
Stylus tungsten M2	1	27.5	1
Long adapt M3/M2 CF	—	30	1
Knuckle Joint steel M2	—	17.2	1
5-way stylus holder M2	—	8	1
Pin spanner	1.2	23	2
Hexagon wrench	—	—	1

* Only available as a set.

■ Set No. 06AGG826*



Description	ø (mm)	L (mm)	Qty
Stylus steel-ruby M2	4	20	1
Stylus steel-ruby M2	3	20	1
Stylus steel-ruby M2	2	20	5
Stylus steel-ruby M2	1	10	1
Extension steel M2	—	30	1
Extension steel M2	—	20	1
Extension steel M2	—	10	4
5-way stylus holder M2	—	8	1
Pin spanner	1.2	23	2

* Only available as a set.

■ Set No. 06AGG827*



Description	ø (mm)	L (mm)	Qty
Stylus tungsten M2	0.5	10	1
Stylus tungsten M2	0.7	10	1
Stylus steel-ruby M2	1	10	1
Stylus steel-ruby M2	1	20	1
Stylus steel-ruby M2	2	20	4
Adaptor M3/M2	—	5	1
5-way stylus holder M2	—	8	1
Extension steel M2	—	20	1
Pin spanner	1.2	23	2

* Only available as a set.

■ Stylus Cleaner

■ Preventing inaccurate measurements caused by an unclean stylus

The stylus cleaner removes dust and debris adhering to the stylus of a CNC CMM. It removes dirt from the stylus in only about 30 seconds, due to the combination of cleaning fluid and compressed air.

Stylus cleaner:

- Eliminates the hassle of manual stylus cleaning.
- Avoids the risk of inaccurate measurements caused by an unclean stylus.
- Allows accurate calibration by conducting stylus cleaning before calibration.

A stylus cleaner improves the efficiency and reliability of your quality assurance!



① The probe moves to the sensor of the stylus cleaner.



② The probe moves to above the cleaner.



20 seconds
Time (number of times)
can be set arbitrarily.



④ Cleaning complete



The probe moves the cleaning unit up and down several times to clean the stylus with cleaning fluid and compressed air.



Unclean stylus



Stylus after cleaning

Applicable with down-facing styli

Applicable stylus length: 20 mm or more

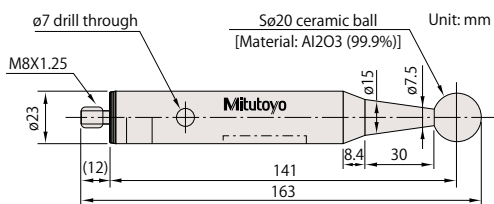
Applicable stylus diameter: 8 mm or less

By registering the cleaner position in advance, these operations can be performed as CNC part programs. Automatic cleaning operation can be added after probe replacement or during workpiece measurement. (The CNC part program for stylus cleaning is provided by Mitutoyo.)

Ceramic Master Ball

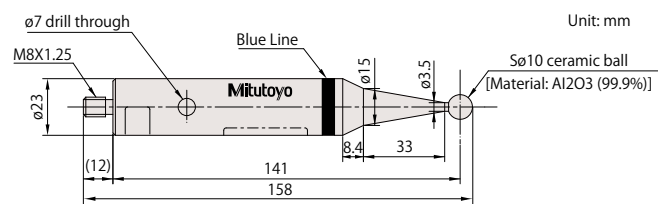
Ceramic master ball (standard type)

- Ball sphericity: 0.13 μm or less
- Ball diameter dimensional tolerance: $S\phi 20_{-0.1}^0 \text{ mm}$



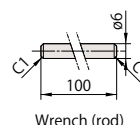
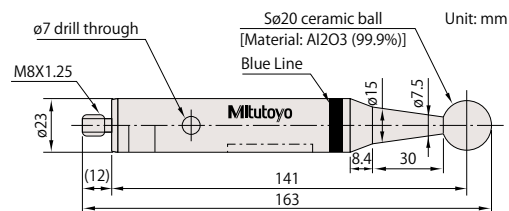
Ceramic master ball (high-accuracy type)

- Ball sphericity: 0.08 μm or less
- Ball diameter dimensional tolerance: $S\phi 10_{-0.05}^0 \text{ mm}$



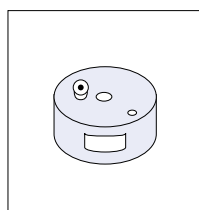
Ceramic master ball (high-accuracy type)

- Ball sphericity: 0.08 μm or less
- Ball diameter dimensional tolerance: $S\phi 20_{-0.1}^0 \text{ mm}$

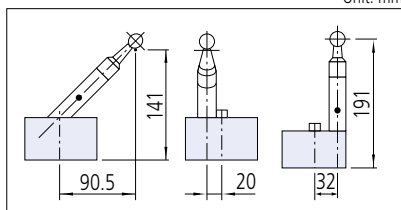


Base

Base for a ceramic master ball



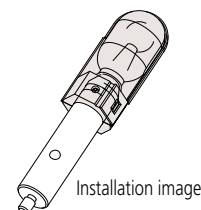
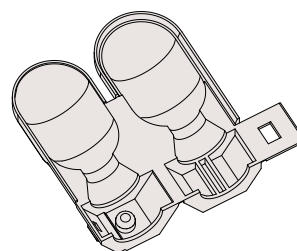
Base appearance



Ceramic ball attachment figure

Master ball cover (Part No. 06AFJ091)

Cover for a ceramic master ball



Installation image

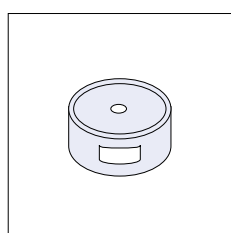
Set break-downs

Set code No.	Ball diameter (mm)	Type	Master ball cover	Base	Inspection certificate	Calibration certificate	Traceability system diagram	Calibration certificate (JCSS)
06AFK288A	20	Standard	✓	—	✓	—	—	—
06AFK288B	20	Standard	✓	—	✓	✓	✓	—
06AFK288D	20	Standard	✓	—	—	—	—	✓
06AFK289A	20	Standard	✓	✓	✓	—	—	—
06AFK289B	20	Standard	✓	✓	✓	✓	✓	—
06AFK289D	20	Standard	✓	✓	—	—	—	✓
06AFK290A	20	High-accuracy	✓	—	✓	—	—	—
06AFK290B	20	High-accuracy	✓	—	✓	✓	✓	—
06AFK290D	20	High-accuracy	✓	—	—	—	—	✓
06AFK291A	20	High-accuracy	✓	✓	✓	—	—	—
06AFK291B	20	High-accuracy	✓	✓	✓	✓	✓	—
06AFK291D	20	High-accuracy	✓	✓	—	—	—	✓
06AFK292A	10	High-accuracy	✓	—	✓	—	—	—
06AFK292B	10	High-accuracy	✓	—	✓	✓	✓	—
06AFK292D	10	High-accuracy	✓	—	—	—	—	✓

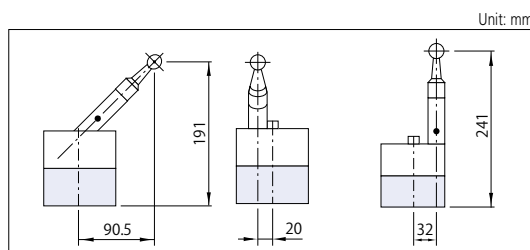
Optional accessory for the Ceramic Master Ball

Spacer

Spacer for the base



Spacer appearance



Attaching Spacer to Ceramic Master Ball + Base

Joystick Box

The joystick box allows users to easily operate their CMM from a remote location when creating a part program in teaching mode or operating the machine manually. Three types are available to suit your purpose.



JSBOX-M2



JSBOX-V2

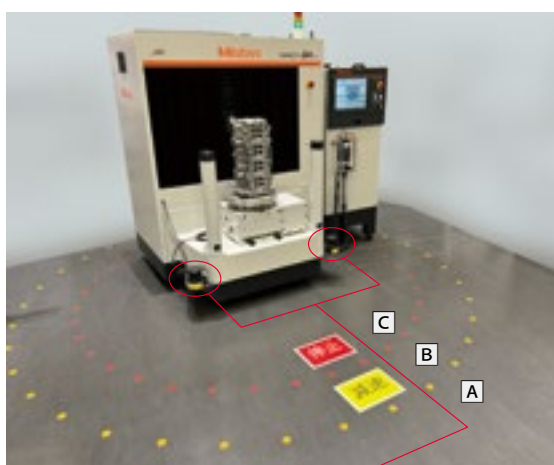


JSBOX-HANDY2

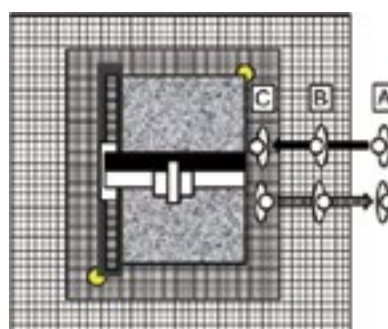
Safety Laser Scanner



The safety of CNC CMM can be enhanced by attaching the device to the machine. When a person enters the set hazardous area, the machine will reduce speed and stop automatically.

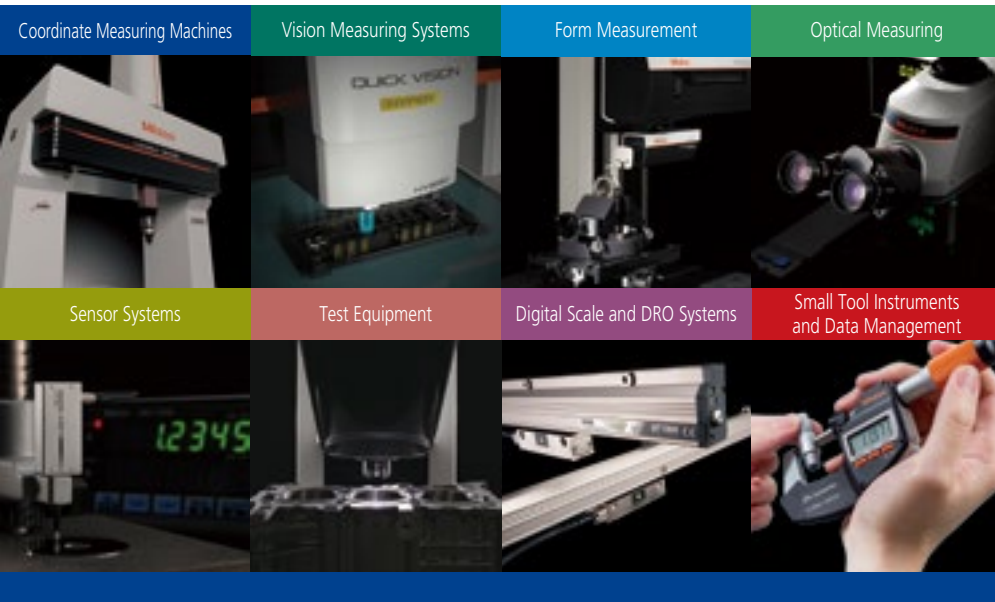


Installation of safety laser scanners
Two safety laser scanners are attached to both sides of front of MACH-3A.



Operation of safety laser scanners

	Hazardous area	Speed
[C]	forbidden area	stop
[B]	warned area	low speed
[A]	outside the hazardous area	fast movement speed



Whatever your challenges are, Mitutoyo supports you from start to finish.

Mitutoyo is not only a manufacturer of top quality measuring products but one that also offers qualified support for the lifetime of the equipment, backed up by comprehensive services that ensure your staff can make the very best use of the investment.

Apart from the basics of calibration and repair, Mitutoyo offers product and metrology training, as well as IT support for the sophisticated software used in modern measuring technology. We can also design, build, test and deliver measuring solutions and even, if deemed cost-effective, take your critical measurement challenges in-house on a sub-contract basis.



Find additional product literature and our product catalogue

<https://www.mitutoyo.co.jp/global.html>

Notes on Export Regulations:

Do not commit an act, which could directly or indirectly, violate any law or regulation of Japan, your country or any other international treaty, relating to the export or re-export of any commodities.

Note: Product illustrations are without obligation. Product descriptions, in particular any and all technical specifications, are only binding when explicitly agreed upon.

MITUTOYO and MICAT are either registered trademarks or trademarks of Mitutoyo Corp. in Japan and/or other countries/regions. Other product, company and brand names mentioned herein are for identification purposes only and may be the trademarks of their respective holders.

All product information contained in this brochure is current as of Nov. 2024.

Mitutoyo

Mitutoyo Corporation

20-1, Sakado 1-Chome,
Takatsu-ku, Kawasaki-shi,
Kanagawa 213-8533, Japan

T +81 (0) 44 813-8230

F +81 (0) 44 813-8231

<https://www.mitutoyo.co.jp>