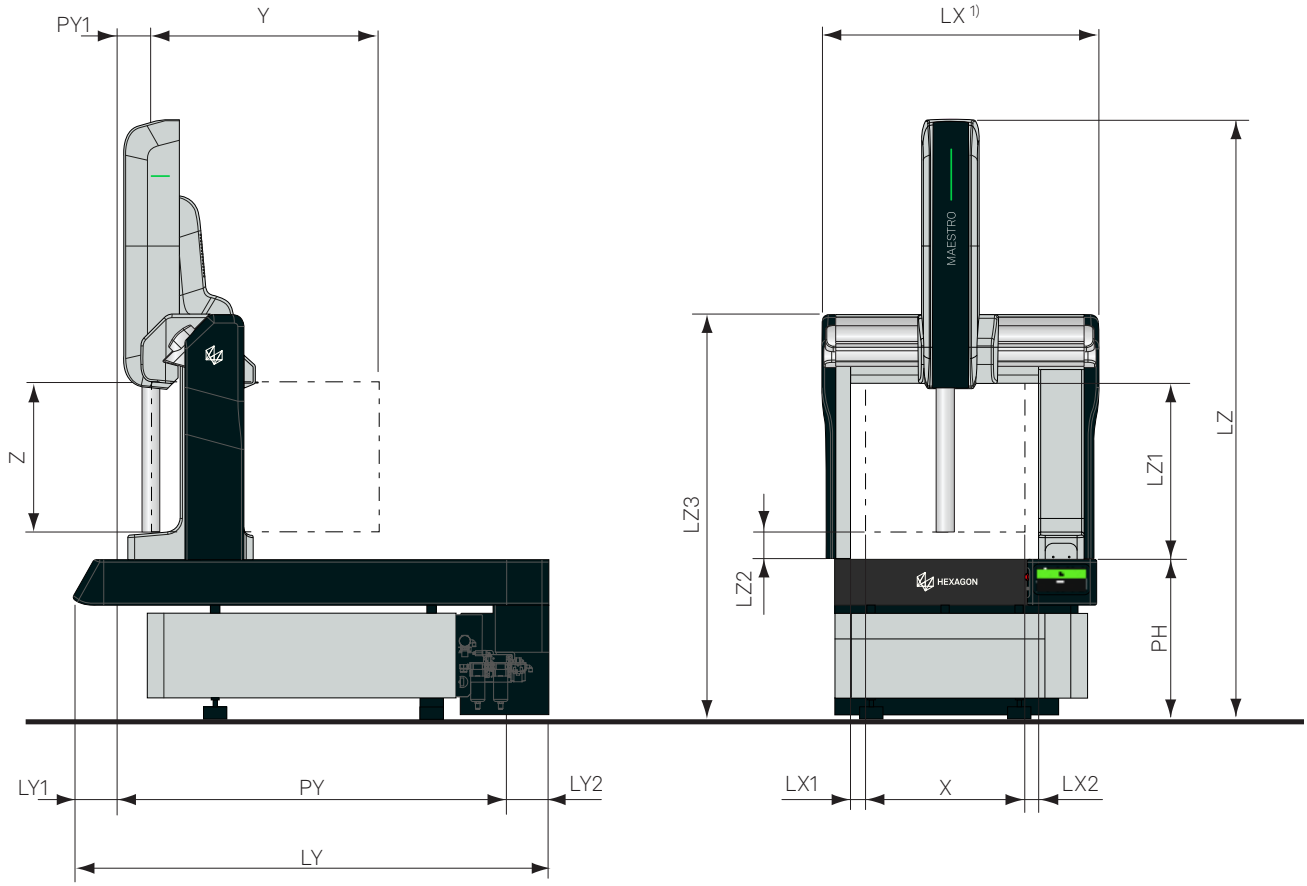
HEXAGON

Data Sheet

MAESTRO

Version 2025-05

MAESTRO: Overall dimensions

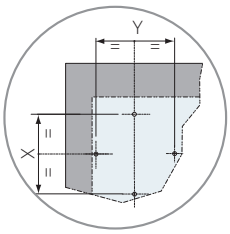


	05.07.05	07.10.07	09.12.08	09.15.08	09.20.08
X	500	700	900	900	900
Y	700	1000	1200	1500	2000
Z	500	660	800	800	800
LX 1)	1018	1218	1510	1510	1510
LX1	66	66	68	68	68
LX2	60	60	69	69	69
LY	1707	2104	2483	2783	3283
LY1	194	194	191	191	191
LY2	263	260	262	262	262
LZ	2315	2634	2954	2954	2954
LZ1	618	777	934	934	934
LZ2 2)	107	107	141	141	141
LZ3	1616	1776	1919	1919	1919
PH	700	700	600	600	600
PY	1250	1650	2030	2330	2830
PY1	90	150	201	201	201
Max. part weight	250	900	1300	1500	1800
CMM weight approx.	900	1400	2350	2600	3000

Dimensions in mm and weight in kg
1) With bellows LX = LX + 6 mm
2) Sensor interface included

MAESTRO: Technical characteristics

Mechanical frame		X: Micromachined anodized light alloy extrusion Y: Integral dovetail guideways, machined into the table Z: Micromachined anodized light alloy extrusion
Surface plate		Material: Granite Flatness: according to DIN 876/III M8 x 1.25 threaded inserts thread length 20 mm. Diagonally staggered hole pattern: MAESTRO 05.07.05: X = 300 mm ; Y = 300 mm MAESTRO 07.10.07: X = 300 mm ; Y = 300 mm MAESTRO 09.YY.08: X = 350 mm ; Y = 350 mm
Sliding system		Air bearings on all axes
Measuring system		METALLUR® linear scales; overall system resolution: 0.0003 µm
Temperature compensation		Extended temperature 16 - 26 °C: Multi-sensor technology
Ram counterbalance		Pneumatic, adjustable
Controller		Embedded and located at the rear side of the system.
Electrical power	Supply voltage Consumption	100-120/220-240 V ± 10 % - 50/60 Hz Constant: < 0.5 kVA; Peak: 1.5 kVA
Air supply	Pressure Consumption	≥ 0.5 MPa (5 bar) class 4, according to ISO 8573/1 < 70 Nl/min (for 05.07.05 and 07.10.07 sizes); < 90 Nl/min (for 09.YY.08 size) UNI ISO 8778
Operating specifications		Ambient temperature: 10 - 40 °C Relative humidity: 20 % - 90 %, non-condensing



MAESTRO: Minimum door opening requirements

Standard size frames	Machine maximum overall dimension Width (mm) [1]	Height (mm) [1]
05.07.05	969	2310
07.10.07	1169	2630
09.12.08 – 09.15.08 – 09.20.08	1496	2101

1) Minimum dimensions are listed:
w/o CMM Z cover for MAESTRO 05.07.05 and MAESTRO 07.10.07
w/o pedestals and CMM Z cover for MAESTRO 09.YY.08
Dimensions shown are from the highest point at the top of the CMM to the lowest point on the CMM as in shipped condition.
Dimensions shown do not include lifting equipment.
Dimensions shown are with 25 mm minimum clearance all around.
NOTE: For detailed information on how to handle the CMM movement please refer to installation manual.

MAESTRO basic configuration: Specifications with articulating wrist

ISO 10360-2:2009

Max. permissible errors (MPE) and limits (MPL) [µm]		05.07.05	07.10.07	09.YY.08
Volumetric length measurement error 18 - 22 °C	E0/E150	1.5 + L/350	1.5 + L/350	1.5 + L/350
Volumetric length measurement error 16 - 26 °C	E0/E150	1.5 + L/300	1.5 + L/300	1.5 + L/300
Repeatability range	R0	1.2	1.2	1.2

ISO 10360-5:2020

Max. permissible errors MPE [µm]		05.07.05	07.10.07	09.YY.08
Scanning mode form error	$P_{Form.Sph.Scan:PP:Tact}$	2.0	2.0	2.0
Scanning mode size error	$P_{Size.Sph.Scan:PP:Tact}$	2.0	2.0	2.0
Scanning time	$\tau_{Sph.Scan:PP:Tact}$	35	35	35
Scanning mode form error - not pre-defined path	$P_{Form.Sph.Scan:NPP:Tact}$	2.0	2.0	2.0
Scanning mode size error - not pre-defined path	$P_{Size.Sph.Scan:NPP:Tact}$	2.0	2.0	2.0
Scanning time - not pre-defined path	$\tau_{Sph.Scan:NPP:Tact}$	50	50	50
Single-stylus form error	$P_{Form.Sph.1\times25:SS:Tact}$	1.5	1.5	1.5
Single-stylus size error	$P_{Size.Sph.1\times25:SS:Tact}$	1.3	1.3	1.3
Multi-stylus form error	$P_{Form.Sph.5\times25:Emp:Tact}$	5.9	5.9	5.9
Multi-stylus size error	$P_{Size.Sph.5\times25:Emp:Tact}$	2.1	2.1	2.1
Multi-stylus location error	$L_{Dia.5\times25:Emp:Tact}$	4.0	4.0	4.0
Scanning mode form error with FastCal	$P_{Form.Sph.Scan:PP:Tact}$	4.5	4.5	4.5
Scanning mode size error with FastCal	$P_{Size.Sph.Scan:PP:Tact}$	4.0	4.0	4.0
Scanning time with FastCal	$\tau_{Sph.Scan:PP:Tact}$	35	35	35
Scanning mode form error - not pre-defined path with FastCal	$P_{Form.Sph.Scan:NPP:Tact}$	4.5	4.5	4.5
Scanning mode size error - not pre-defined path with FastCal	$P_{Size.Sph.Scan:NPP:Tact}$	4.0	4.0	4.0
Scanning time - not pre-defined path with FastCal	$\tau_{Sph.Scan:NPP:Tact}$	50	50	50
Multi-stylus form error with FastCal	$P_{Form.Sph.5\times25:Inf:Tact}$	11.0	11.0	11.0
Multi-stylus size error with FastCal	$P_{Size.Sph.5\times25:Inf:Tact}$	3.5	3.5	3.5
Multi-stylus location error with FastCal	$L_{Dia.5\times25:Inf:Tact}$	9.5	9.5	9.5

- E0, R0 are valid for DST 200: styli ø 3 x 50 mm (SS) and DTT 30 module: ø 3 x 30 mm (TC). Length unit measure (L) in mm.
- $P_{Form.Sph.1\times25:SS:Tact}$ and $P_{Size.Sph.1\times25:SS:Tact}$ are valid for DST 200: styli ø 3 x 50 mm (SS) and ø 5 x 20 mm (SS) and DTT 30 module: ø 3 x 30 mm (TC) and ø 4 x 20 mm (SS) without extension; anywhere in the measuring volume.
- ISO 10360-5 specifications are valid for a test sphere with calibrated form ≤ 0.1 µm and the respective uncertainty ≤ 0.1 µm and uncertainty of calibrated sphere diameter ≤ 0.21 µm.
- Multi-stylus error test performed up to 100 mm from the qualification sphere.

MAESTRO configuration with Accuracy+ and Throughput+ options: Specifications with articulating wrist

ISO 10360-2:2009

Max. permissible errors (MPE) and limits (MPL) [µm]		05.07.05	07.10.07	09.YY.08
Volumetric length measurement error 18 - 22 °C	E0/E150	1.2 + L/350	1.2 + L/350	1.2 + L/350
Volumetric length measurement error 16 - 26 °C	E0/E150	1.2 + L/300	1.2 + L/300	1.2 + L/300
Repeatability range	R0	1.0	1.0	1.0

ISO 10360-5:2020

Max. permissible errors MPE [µm]		05.07.05	07.10.07	09.YY.08
Scanning mode form error	$P_{Form.Sph.Scan:PP:Tact}$	1.8	1.8	1.8
Scanning mode size error	$P_{Size.Sph.Scan:PP:Tact}$	1.8	1.8	1.8
Scanning time	$\tau_{Sph.Scan:PP:Tact}$	20	20	20
Scanning mode form error - not pre-defined path	$P_{Form.Sph.Scan:NPP:Tact}$	1.8	1.8	1.8
Scanning mode size error - not pre-defined path	$P_{Size.Sph.Scan:NPP:Tact}$	1.8	1.8	1.8
Scanning time - not pre-defined path	$\tau_{Sph.Scan:NPP:Tact}$	30	30	30
Single-stylus form error	$P_{Form.Sph.1\times25:SS:Tact}$	1.2	1.2	1.2
Single-stylus size error	$P_{Size.Sph.1\times25:SS:Tact}$	1.0	1.0	1.0
Multi-stylus form error	$P_{Form.Sph.5\times25:Emp:Tact}$	4.9	4.9	4.9
Multi-stylus size error	$P_{Size.Sph.5\times25:Emp:Tact}$	1.5	1.5	1.5
Multi-stylus location error	$L_{Dia.5\times25:Emp:Tact}$	3.5	3.5	3.5
Scanning mode form error with FastCal	$P_{Form.Sph.Scan:PP:Tact}$	4.5	4.5	4.5
Scanning mode size error with FastCal	$P_{Size.Sph.Scan:PP:Tact}$	4.0	4.0	4.0
Scanning time with FastCal	$\tau_{Sph.Scan:PP:Tact}$	30	30	30
Scanning mode form error - not pre-defined path with FastCal	$P_{Form.Sph.Scan:NPP:Tact}$	4.5	4.5	4.5
Scanning mode size error - not pre-defined path with FastCal	$P_{Size.Sph.Scan:NPP:Tact}$	4.0	4.0	4.0
Scanning time - not pre-defined path with FastCal	$\tau_{Sph.Scan:NPP:Tact}$	45	45	45
Multi-stylus form error with FastCal	$P_{Form.Sph.5\times25:Inf:Tact}$	11.0	11.0	11.0
Multi-stylus size error with FastCal	$P_{Size.Sph.5\times25:Inf:Tact}$	3.5	3.5	3.5
Multi-stylus location error with FastCal	$L_{Dia.5\times25:Inf:Tact}$	9.5	9.5	9.5

- E0, R0 are valid for DST 200: styli ø 3 x 50 mm (SS) and DTT 30 module: ø 3 x 30 mm (TC). Length unit measure (L) in mm.
- $P_{Form.Sph.1\times25:SS:Tact}$ and $P_{Size.Sph.1\times25:SS:Tact}$ are valid for DST 200: styli ø 3 x 50mm (SS) and ø 5 x 20 mm (SS) and DTT 30 module: ø 3 x 30 mm (TC) and ø 4 x 20 mm (SS) without extension; anywhere in the measuring volume.
- ISO 10360-5 specifications are valid for a test sphere with calibrated form ≤ 0.1 µm and the respective uncertainty ≤ 0.1 µm and uncertainty of calibrated sphere diameter ≤ 0.21 µm.
- Multi-stylus error test performed up to 100 mm from the qualification sphere.

MAESTRO: Non-contact sensors specifications

Max. permissible errors (MPE) and limits (MPL) [µm]				DSL 100 [1]
ISO 10360-8:2013	Sphere	Probing dispersion value	$P_{Form.Sph.D95\%:Tr:ODS}$	12
	Sphere	Probing form error	$P_{Form.Sph.1x25:Tr:ODS}$	8
	Sphere	Probing size error All	$P_{Size.Sph.All:Tr:ODS}$	14
	Sphere	Articulated location value	$L_{Dia.5\times25:Art:ODS}$	24
	Plane	Probing dispersion value	$P_{Form.Pla.D95\%:Tr:ODS}$	15
ISO 10360-9:2013 [2]	Sphere	Probing location error	$L_{Dia.2\times25:MPS}$	18

1) Some restrictions to workpiece size and machine configuration may apply when used on MAESTRO 05.07.05
2) DTT 100: stylus Ø 3 x 30 mm (TC) or DST 200: stylus Ø 3 x 50 mm (SS)

Specifications include measurement uncertainty according to ISO/TS 17865:2016 and are valid for:
- Constant CMM scanning speed of 25 mm/sec.
- Tests performed with standard configuration without (e.g. angular) adaptors or/and extensions.
- Exposure setting of 22 % (UD).
- Decimation setting of 100 % (if applicable).
- Automatic probe exchange when applicable for the test.
- Combination of DSL 100 with tactile probing sensor using the same styli specified for the single probing error test according to ISO 13060-5 when applicable for the test.
- Probing error test on spherical artifact performed on white matt sphere (properties according to PN: H00044223):
  Calibrated for form with three great circles and maximum form deviation of 0.5 µm and maximum calibration uncertainty U of 0.04 µm
  Calibrated for size with three great circles and maximum calibration uncertainty U of 0.02 µm.
- Probing error test on plane artifact performed on white plane (properties according to PN: H00044226)
  Calibrated for form with union jack strategy with approximately 3000 individual points with maximum form deviation of 1.5 µm and maximum calibration uncertainty U of 0.28 µm.

MAESTRO: Throughput and dynamics

	Max. 3D speed	Max. 3D acceleration [4]
Dynamics	700 mm/s	2800 mm/s²
Dynamics with Throughput+ option [3]		
for MAESTRO 05.07.05 and 07.10.07	900 mm/s	6100 mm/s²
for MAESTRO 09.YY.08	1100 mm/s	6500 mm/s²

3) Dynamics reduction may apply to meet specific customer and/or local safety requirements.
4) Acceleration reduction may apply with pneumatic dampers configuration.

MAESTRO: Temperature specifications

	Lab temperature	Extended temperature
Ambient temperature	18 °C - 22 °C	16 °C - 26 °C
Max. air temperature variation	1 °C/h - 2 °C/24h	1 °C/h - 10 °C/24h
Max. gradient in space	1 °C/m	1 °C/m

MAESTRO: Probe heads and sensors

Technical characteristics	DW 2.5 digital wrist
Angular rotation	A axis: ± 105° B axis: infinite rotation motion
Angular rotation step	2.5°
Max. applied torque	1.2 Nm
Max. extensions length	450 mm

Technical characteristics	DTT B digital touch trigger probe
Probe connector	M8 with active 1 wire connection
Probing direction	6 Way ±X, ±Y and ±Z
Stylus mounting	M2 thread
Max. straight styli length	Up to 75 mm with any material or 100 mm with carbon fiber (DTT 100 module)
Max. star styli dimensions	Up to length: 50 mm; extension: 20 mm; span: 30 mm (DTT 100 module)

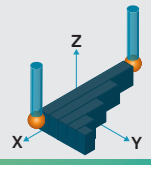
Technical characteristics	DST 200 digital scanning probe
Probe connector	TKJ (kinematic joint)
Resolution	< 0.1 µm
Measuring range	± 2 mm in all axes
Stylus holder thread	M3
Max. stylus weight (including stylus clamping)	33 g
Max. stylus length	Axial: up to 225 mm Lateral: up to 100 mm

Technical characteristics	DSL 100 digital laser scanner
Laser class	2 (EN / IEC 60825-1:2014)
Standoff and depth (Z)	90 ± 30 mm (additional 30 mm with eFOV2)*
Laser line width	80 mm (at mid-field)
Scanning frequency (lines per second)	300 Hz
Data rate	600 000 pts/sec
Protection against dust and water	IP51 (IEC/EN 60529) (except for warm-up terminal)
Weight	427 g

* Points are collected even in the extended field of view (another 30 mm) but with descreasing accuracy.

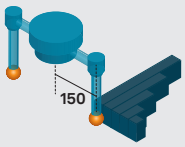
Performance verification

ISO 10360-2
Volumetric length measurement error E0



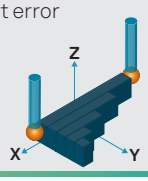
5 length gauges have to be measured 3 times with one probing at each end, in 7 different directions. All measurement results must be within MPE (E0).

ISO 10360-2
Volumetric length measurement error E150



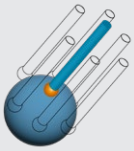
5 length gauges have to be measured 3 times in the YZ or XZ plane with opposite styli, mounted 150 mm off the Z spindle axis.

ISO 10360-2
Repeatability range of the length measurement error



Extreme value of the repeatability range of the length measurement error, calculated by 3 repeated measurements on each size for a total of 35 values. The 35 repeatability range results must be within MPL (R0).

ISO 10360-5
Single-stylus form/size error

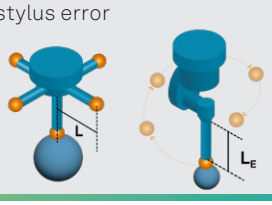


A precision sphere has to be measured with 25 probings.
$P_{Form.Sph.1x25:SS:Tact}$ is the range of all radii.
$P_{Form.Sph.1x25:SS:Tact} = R_{max} - R_{min}$ = sphere form.
$P_{Size.Sph.1x25:SS:Tact}$ is the deviation of measured and calibrated sphere diameter.
$P_{Size.Sph.1x25:SS:Tact} = D_{meas} - D_{cal}$

ISO 10360-5
Scanning mode form/size error

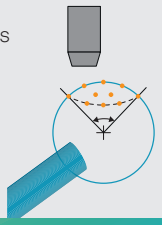
A precision sphere has to be scanned with 4 defined lines.
$P_{Form.Sph.Scan:PP:Tact}$ is the range of all radii.
$P_{Form.Sph.Scan:PP:Tact} = R_{max} - R_{min}$ = sphere form, scanning.
$P_{Size.Sph.Scan:PP:Tact}$ is the deviation of measured and calibrated sphere diameter.
$P_{Size.Sph.Scan:PP:Tact} = D_{meas} - D_{cal}$

ISO 10360-5
Multi-stylus error



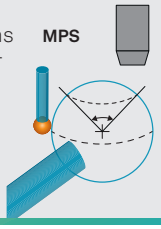
A sphere is measured with 5 styli (fixed probe head) or with 1 stylus in 5 orientations (articulating wrist) with 5 x 25 probings. Form, size and location error over 125 points.

ISO 10360-8
Optical distance sensors form/size error



A sphere is measured with 25 optical probings.
$P_{Form.Sph.1x25:Tr:ODS}$ is the range of all radii.
$P_{Form.Sph.1x25:Tr:ODS} = R_{max} - R_{min}$ = sphere form.
$P_{Size.Sph.1x25:Tr:ODS}$ is the deviation of measured and calibrated sphere diameter.
$P_{Size.Sph.1x25:Tr:ODS} = D_{meas} - D_{cal}$

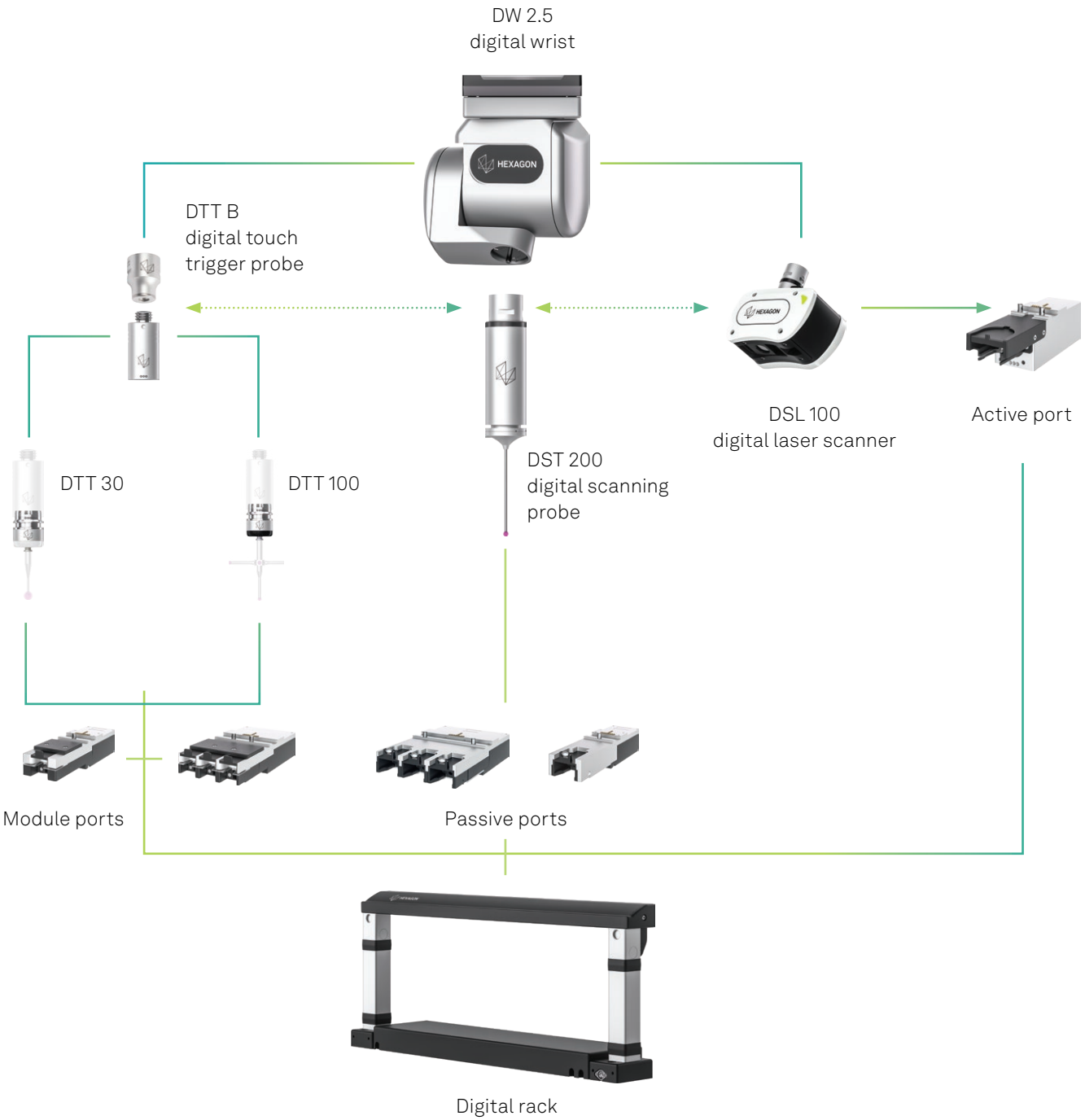
ISO 10360-9
Multiple probing systems form/size/location error



A sphere is measured with contact and non-contact sensor, with 25 probings each. Form and size error over all 50 points. Location error $L_{Dia.2x25:MPS}$ = space distance between both centre points.

For more information, please refer to the brochure:
Acceptance and reverification tests for coordinate measuring machines (CMMs) – According to ISO 10360.

Probe and sensor availability



Probe configuration compatibility matrix

Sensor configurations	Touch+	Scan+	Speed
DW 2.5	Standard	Standard	Standard
DTT B	Included	Optional	Standard
DTT 30	Optional	Optional	Optional
DTT 100	Standard	Optional	Standard
DST 200	Not available	Included	Optional
DSL 100	Not available	Not available	Included

MAESTRO frame sizes

5.7.5

X: 500 mm

Y: 700 mm

Z: 500 mm

7.10.7

X: 700 mm

Y: 1000 mm

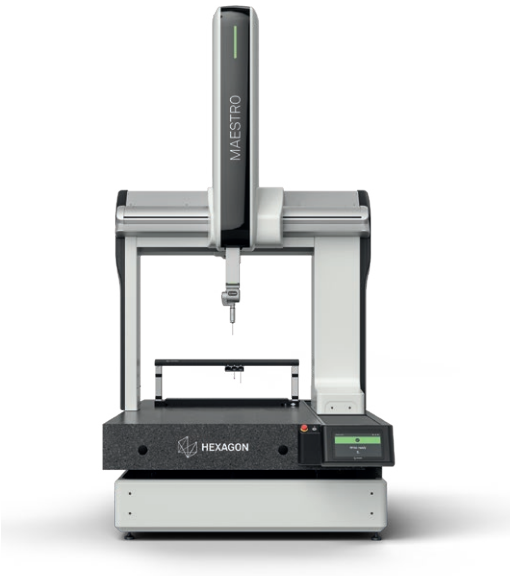
Z: 700 mm

9.YY.8

X: 900 mm

Y: 1200 mm | 1500 mm | 2000 mm

Z: 800 mm



MAESTRO pre-configured packages

MAESTRO can be configured using pre-configured packages, or by configuring all components such as size, sensors, racks, software, and accessories, completely individually.

MAESTRO Touch+

General-purpose measurements of size features with highly repeatable touch-trigger probing.

DTT B
digital touch trigger probe

Metrology software
PC-DMIS

MAESTRO Scan+

General-purpose measurements of size and form features with high performance tactile scanning.

DST 200
digital scanning probe

Metrology software
PC-DMIS

scan PILOT

Scan Pilot for improved scanning performance

MAESTRO Speed

High-throughput measurements of complete part surfaces with high measuring point density.

DSL 100
digital laser scanner

Metrology software
PC-DMIS

scan PILOT

Scan Pilot for improved scanning performance

Digital rack (DR) including modules for DSL 100

Hexagon is a global leader in digital reality solutions, combining sensor, software and autonomous technologies. We are putting data to work to boost efficiency, productivity, quality and safety across industrial, manufacturing, infrastructure, public sector, and mobility applications.

Our technologies are shaping production and people-related ecosystems to become increasingly connected and autonomous – ensuring a scalable, sustainable future.

Hexagon's Manufacturing Intelligence division provides solutions that use data from design and engineering, production and metrology to make manufacturing smarter.

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