



# LEITZ SIRIO LINE

Version 7/2014



<b>Description</b>	High-speed measuring machines for quality control in the shop floor. With integrated continuous rotary table and automatic styli changer (max. 24 positions).
<b>Applications</b>	Universal measuring machine for fast inspection of powertrain components near and in the production line. Especially suitable for process control in series manufacturing.
<b>Design</b>	
Frame	Measuring machines with horizontal spindle and integrated continuous rotary table. Machine base in "Closed Frame" design with PrimeTHERM technology (SIRIO SX).
Guide ways	SIRIO SX: Pre-loaded air bearings in all axes. SIRIO Xi: Re-circulating precision ball guides in all axes (rotary table with air bearings).
Drives	High-performance DC motors with electronic drive monitoring. Power transmission by re-circulating ball screw drives.
Length measuring system	SIRIO SX: Glass ceramic (X axis) and steel scales (Y and Z axis) with electro-optic transducers. SIRIO Xi: Steel scales in all axes with electro-optic transducers.
Resolution	0.02 µm
Temperature compensation	Compensation of temperature-related geometric errors in real time by mathematical correction models based on integrated temperature sensors. Workpiece temperature measured with CNC-controlled sensor.
Damping system	SIRIO SX: Active pneumatic vibration damping. SIRIO Xi: Passive vibration damping.



Probe head	SIRIO SX	SIRIO Xi
Type	Leitz LSP-S8	Leitz LSP-S10
Measuring method	Dynamic single-point probing Leitz Pathfinder technology consisting of: 3D self-centering scanning, variable high-speed scanning (VHSS), tag-scan, scan catch, four-axis scan (QUINDOS)	
Max. data rate, scanning	1000 points/s	1000 points/s
Probing force	0.6 N	0.6 N
Max. stylus length	400 mm	250 mm
Max. stylus weight	500 g	500 g
Smallest stylus tip diam.	0.8 mm	0.8 mm

### Electronics and safety

Machine control	SIRIO SX: B4, with optional cooling unit. SIRIO Xi: B5, temperature-resistant up to 40 °C.
Electronic design	Service-friendly and modular design with integrated monitoring. Worldwide remote diagnosis through Hexagon Metrology Service and internet connection available.
Collision protection	For the complete machine, in setup mode.
Safety standards	CE-compliant with machine directive (2006-42-EG), EMI directive (2004/108/EG).
Safety devices	Sick laser scanner to safeguard the work area.

Supply specifications	B4 (SIRIO SX)	B5 (SIRIO Xi)
Protection class	IP 54	IP 54
Operating voltage	230 V ± 10%, 50-60 Hz, P, N+PE	230 V ± 10%, 50-60 Hz, P, N+PE
Power requirement	1.4 kVA, max. 2.9 kVA	1.4 kVA
Rated current	6 A 8.5 A with high-speed stylus change 12.5 A with high-speed stylus changer and cooling unit	6 A
Recommended main fuse	16 A	16 A

Air supply	SIRIO SX	SIRIO Xi
Pressure	≥ 0.55 MPa (5.5 bar)	≥ 0.5 MPa (5 bar)
Consumption	ca. 149 NI/min	ca. 58 NI/min
Quality	Class 4 according to ISO 8573, part 1	Class 4 according to ISO 8573, part 1

Options	
	<ul style="list-style-type: none"> <li>– High-speed stylus changer (SIRIO SX)</li> <li>– Manual and automated part loading systems</li> <li>– Fixtures</li> <li>– Part programming and start up support</li> <li>– System integration</li> <li>– Automatic workpiece temperature sensor</li> </ul>

Leitz SIRIO			SX 6.8.9	SX 6.8.15	Xi 6.8.8
<b>Measuring error MPE in <math>\mu\text{m}</math> according to ISO 10360-2 (2010)</b>		Temperature range			
Volumetric length measuring error <sup>1</sup>	$E_0$	18-22 °C	1.5 + L / 400	1.9 + L / 350	1.7 + L / 300
		15-30 °C	1.7 + L / 250		1.7 + L / 250
		30-40 °C	1.8 + L / 200		1.7 + L / 200
Repeatability range <sup>2</sup>	$R_0$		0.8	0.9	1.5
<b>according to ISO 10360-3 (2000)</b>					
Four-axis error, radial	FR		4.0	4.0	4.0
Four-axis error, tangential	FT		5.0	5.0	5.0
Four-axis error, axial	FA		4.0	4.0	4.0
<b>according to ISO 10360-4 (2000)</b>					
Single stylus form error, scanning <sup>3</sup>	THP		1.9 / 45s	2.3 / 45s	1.9 / 39s
<b>according to ISO 10360-5 (2011)</b>					
Single stylus form error <sup>2</sup>	PFTU		1.7	1.9	1.9
Multi styli form error <sup>4</sup>	PFTM		2.9	2.9	2.9
Multi styli size error <sup>4</sup>	PSTM		1.0	1.0	1.2
Multi styli location error <sup>4</sup>	PLTM		1.8	1.8	1.9
<b>according to ISO 12181 (2011)</b>					
Form measurement error <sup>5</sup>	RONt		1.2	1.2	1.5
<b>Permitted environmental conditions</b>					
Temperature gradients per hour/day/meter		18-22 °C	1 / 2 / 2 K	1 / 2 / 2 K	1 / 2 / 2 K
		15-30 °C	3 / 8 / 2 K		3 / 10 / 2 K
		30-40 °C	3 / 10 / 2 K		3 / 10 / 2 K
Relative humidity			30-80%, non-condensing		
<b>Throughput</b>					
Max. probing frequency (points/min)			40 (optional 60)	40	60
Max. acceleration (mm/s <sup>2</sup> )			2800	2500	3500
Max. travel speed (mm/s)			900	900	800

<sup>1</sup>  $E_0$  is valid for a length gauge with a calibrated coefficient of expansion (CTE) between  $10 \times 10^{-6}/\text{K}$  and  $13 \times 10^{-6}/\text{K}$

<sup>2</sup>  $E_0$ ,  $R_0$  and PFTU are valid for a Leitz stylus  $\varnothing 5 \times 80$  mm, without extension; anywhere in the measuring volume

<sup>3</sup> THP is valid for a Leitz stylus  $\varnothing 5 \times 80$  mm

<sup>4</sup> PFTM, PSTM and PLTM are valid for 5 Leitz styli  $\varnothing 5 \times 80$  mm

<sup>5</sup> RONt (MZCI) is valid for a Leitz stylus  $\varnothing 5 \times 80$  mm, filter 50 UPR, with precision calibration. Verification with QUINDOS only.  
Form error (roundness) at a  $\varnothing 50$  mm ring gauge, in scanning mode, acc. to EN ISO 12 181 (VDI/VDE 2617, part 2.2)

Specifications for acceptance test with ball plates on request.  
Specifications are valid only with original Leitz accessories.

**CMM capability charts – diameters and distances**

Tolerance [mm]	Distance or diameter [mm]						
	50	100	200	400	600	1000	2000
± 0.010	0.9 + L / 400	0.8 + L / 500	0.6 + L / 500	0.5 + L / 800			
± 0.015	1.4 + L / 400	1.3 + L / 400	1.0 + L / 400	0.7 + L / 500	0.6 + L / 700		
± 0.020	1.9 + L / 400	1.8 + L / 400	1.5 + L / 400	1.0 + L / 400	0.8 + L / 500	0.6 + L / 700	
± 0.030	2.9 + L / 400	2.8 + L / 400	2.5 + L / 400	2.0 + L / 400	1.5 + L / 400	1.0 + L / 500	0.5 + L / 800
± 0.050	4.8 + L / 300	4.8 + L / 400	4.5 + L / 400	4.0 + L / 400	2.6 + L / 400	2.5 + L / 400	1.0 + L / 500
± 0.070	6.7 + L / 200	6.7 + L / 350	6.3 + L / 300	5.4 + L / 250	5.0 + L / 300	4.5 + L / 400	2.0 + L / 400
± 0.100	9.7 + L / 200	9.5 + L / 200	9.0 + L / 200	8.1 + L / 200	7.0 + L / 200	6.0 + L / 250	4.3 + L / 350

Example: A borehole diameter of 200 mm has a tolerance of ± 0.020 mm.  
 For the inspection of this feature a CMM with a length measuring error  $E_0 = 1.5 + L/400$  [µm] is required.

**CMM capability charts – form tolerances**



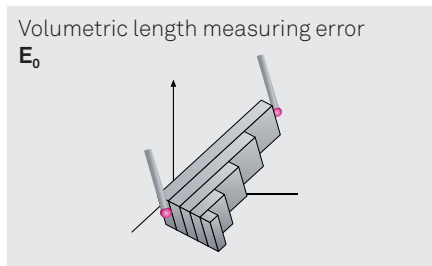
Tolerance	0.005 mm	0.007 mm	0.010 mm	0.015 mm	0.020 mm	0.030 mm	0.050 mm
PFTU [µm]	0.5	0.7	1.0	1.5	2.0		
THP [µm]			1.0	1.5	2.0	3.0	5.0

Example: For inspection of a borehole roundness tolerance of 0.015 mm a CMM with a single stylus form error of PFTU = 1.5 µm or with a single stylus form error scanning THP = 1.5 µm is required.

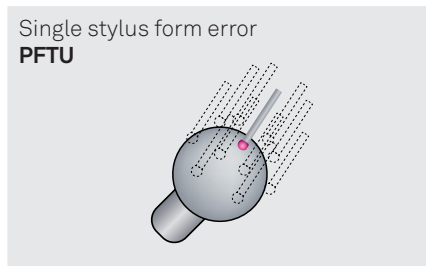
Note: PFTU and THP are only specified for small areas (up to 30 mm).

CMM capability charts are only applicable if the feature can be measured with a stylus for which the accuracy of the CMM is specified.

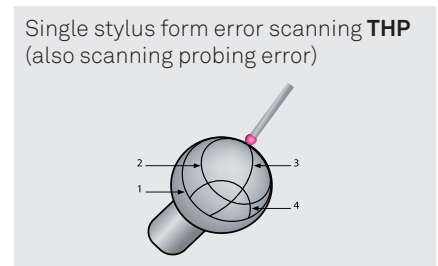
**ISO 10360**



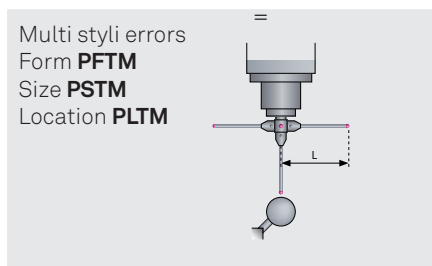
Volumetric length measuring error  $E_0$   
 5 length gauges are measured 3 times in 7 different directions. All measuring results must be within the max. length measuring error » $E_0$ «.



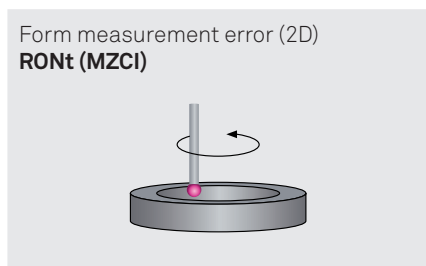
Single stylus form error PFTU  
 A precision sphere is measured with 25 evenly distributed probing points. PFTU is the range of all radii.  
 $P_{FTU} = R_{max} - R_{min} = \text{sphere form}$ .



Single stylus form error scanning THP (also scanning probing error)  
 A precision sphere is measured in scanning mode with 4 defined lines within a given time. THP is the range of all radii.  
 $THP = R_{max} - R_{min} = \text{sphere form, scanning}$ .



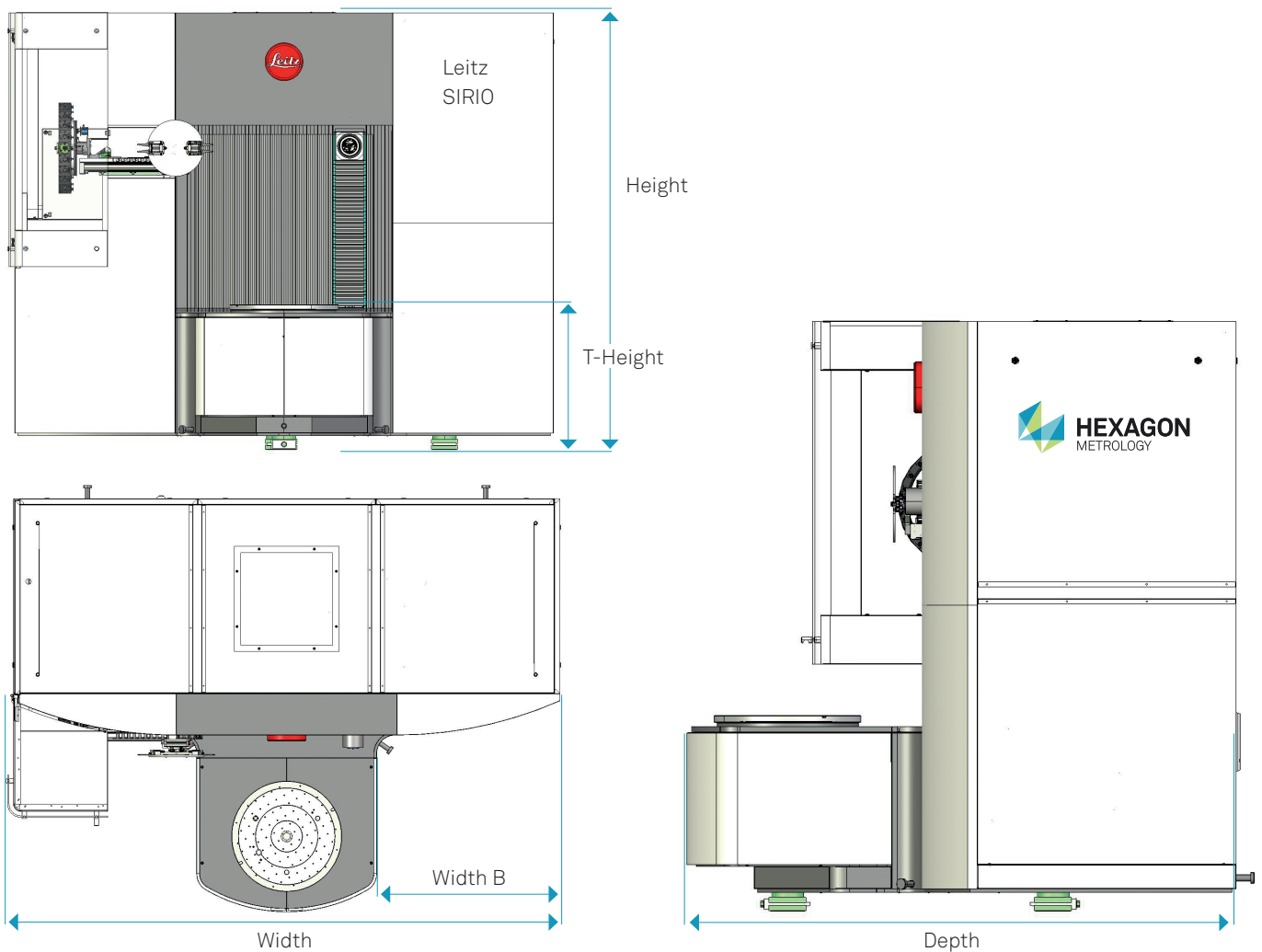
Multi styli errors  
 Form PFTM  
 Size PSTM  
 Location PLTM  
 A sphere is measured with 5 styli (fixed probe head) or with 1 stylus in 5 orientations (articulating PH) with 5 x 25 probing points. Form, size and location error over all 125 points.



Form measurement error (2D) RONt (MZCI)  
 A ring gauge, ø 50 mm, is measured in scanning mode, with high point density. The range of radial distances is then evaluated on a calculated Tschebyscheff circle.

LEITZ SIRIO	SX 6.8.9	SX 6.8.15	Xi 6.8.8
Measuring range (X x Y x Z in mm)	600 x 800 x 900	600 x 800 x 1500	600 x 800 x 800
Table diameter (in mm)	600	600	600
Hole pattern	M8, 50 mm pattern	M8, 50 mm pattern	M8, 50 mm pattern
Permitted workpiece weight (kg)	550	550	550
Max. speed	8 rpm	8 rpm	8 rpm
Mass moment of inertia	20 Kgm <sup>2</sup>	20 Kgm <sup>2</sup>	20 Kgm <sup>2</sup>
Machine weight (kg)	5950	6270	4600

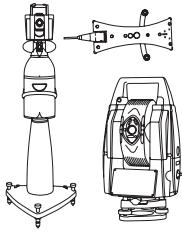
Dimensions in mm



Model	Depth [mm]	Width [mm]	Width incl. high-speed stylus changer	Height [mm]	T-Height [mm]	Width B [mm]
Sirio SX 6.8.9	2645	2509	3330	2482	805	818
Sirio SX 6.8.15	2645	2509	3330	3082	805	818
Sirio Xi 6.8.8	2442	2973	-	2409	805	997

- Integration:** Hexagon Metrology GmbH offers single-source solutions for integrating the SIRIO into the production environment with semi- or fully automated part loading systems.
- Programming:** Our software specialists write the complete measurement programs for each step of the production process in accordance with your measurement and manufacturing plans.
- Start-up support:** On request we offer worldwide on-site support for production start-up.
- Clamping devices:** We design and supply metrologically optimized fixturings matched to your individual pallet system.

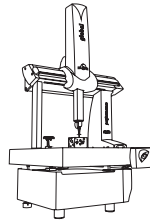




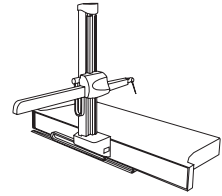
LASER TRACKERS & STATIONS



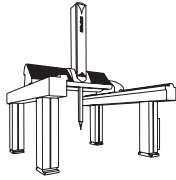
PORTABLE MEASURING ARMS



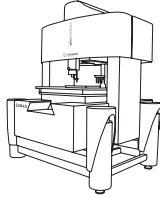
GANTRY CMMS



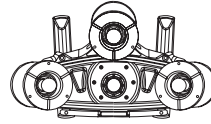
HORIZONTAL ARM CMMS



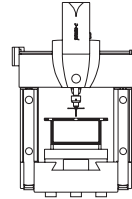
BRIDGE CMMS



MULTISENSOR & OPTICAL SYSTEMS



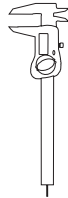
WHITE LIGHT SCANNERS



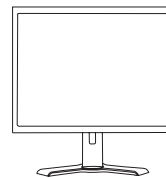
ULTRA HIGH ACCURACY CMMS



SENSORS



PRECISION MEASURING INSTRUMENTS



SOFTWARE SOLUTIONS



## HEXAGON METROLOGY

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