



ZEISS METROTOM

Specifications

Version: 2023-09



Seeing beyond

System description						
ZEISS METROTOM		1	800 / 130 kV	6 scout	800/225 kV HR	1500/225 kV
Operating mode		Stop and go mode, VAST scan mode	Stop and go mode, VAST scan mode	Stop and go mode, VAST scan mode	Stop and go mode, VAST scan mode	Stop and go mode, VAST scan mode
Measuring principle		Measurement of the attenuation of the X-ray radiation due to the component geometry and the density of the material used. The volume data is calculated using the Feldkamp reconstruction algorithm.				
Sensor technology		Detector box	Flat-panel detector	Flat-panel detector	Flat-panel detector	Flat-panel detector
Software		ZEISS INSPECT	ZEISS METROTOM OS/ ZEISS INSPECT	ZEISS INSPECT	ZEISS METROTOM OS/ ZEISS INSPECT	ZEISS METROTOM OS/ ZEISS INSPECT
Applications		Dimensional measurements and non-destructive analyses like defekt analysis, assembly control and others.				

Radiation generation and sensor technology

ZEISS METROTOM		1	800/130 kV	6 scout	800/225 kV HR	1500/225 kV
X-ray tube	Max. tube voltage	in kV	160	130	225	225
	Max. tube current	in µA	7000	300	1000	3000
	Max. target performance	in W	600	39	50	500
	Min. focal spot size	in mm	0.4	0.005	0.004	0.007
Detector	Number of pixels ¹⁾		2560 x 2560	1536 x 1920	3008 x 2512	1920 x 1536
	Pixel size	in µm	78 x 78	127 x 127	100 x100	127 x 127

Resolution (ISO 15708) ²⁾

ZEISS METROTOM		1	800/130 kV	6 scout	800/225 kV HR	1500/225 kV
Maximum spatial resolution at 10 % modulation transfer		in µm	–	3.5 (143 lp/mm ³⁾)	–	4.0 (125 lp/mm ³⁾)

Accuracy (MPE complies with VDI/VDE 2630 sheet 1.3) ²⁾

ZEISS METROTOM		1	800/130 kV	6 scout	800/225 kV HR	1500/225 kV
Stop and go mode	Sphere center point error	SD (TS) in µm	5+L/ 100	2.9+L/100	3.0+L/100	4.0+L/100
	Probing error	PS (TS) in µm	–	3	3	3
		PF (TS) in µm	–	4	4	4
	Length measurement error ⁶⁾	E (TS) in µm	–	6.9+L/100	7+L/100	8+L/100
VAST scan mode ⁵⁾	Sphere center point error	SD (TS) in µm	–	2.9+L/100	–	4.0+L/100
	Probing error	PS (TS) in µm	–	3	–	4
		PF (TS) in µm	–	4	–	4
	Length measurement error ⁶⁾	E (TS) in µm	–	6.9+L/100	–	9 +L/100

1) Max. 3% bleed on each detector margin

2) Factory inspection prior to delivery

3) lp/mm = line pairs per millimeter

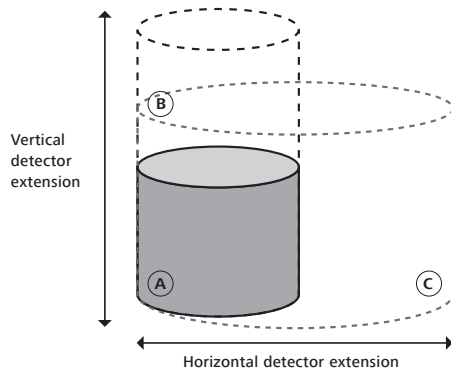
4) Accuracy specification is valid for measurement in the image without image field extension.

5) Accuracy specification is valid for VAST scan mode for number of projections ≥ of number of projections recommended by METROTOM OS

6) Measuring length L in mm.

Measuring range

ZEISS METROTOM				1	800/130 kV		6 scout	800/225 kV HR		1500/225 kV
					Portrait (Standard)	Landscape		Portrait	Landscape (Standard)	
A) in the image without image field extension	Max. Diameter	in mm	165		150	170	240	150	170	330
	Max. Height	in mm	140		170	115	200	170	115	270
B) with max. vertical image field extension	Max. Diameter	in mm	–		150	170	240	150	170	330
	Max. Height	in mm	–		360	360	400	400	385	870
C) with max. vertical and horizontal image field extension [optional]	Max. Diameter	in mm	–		275	300	–	275	300	615
	Max. Height	in mm	–		360	360	–	380	360	800



- (A) Imaging volume without image field extension
- (B) With maximal vertical image field extension
- (C) With maximal vertical and horizontal image field extension [optional]

Travel path

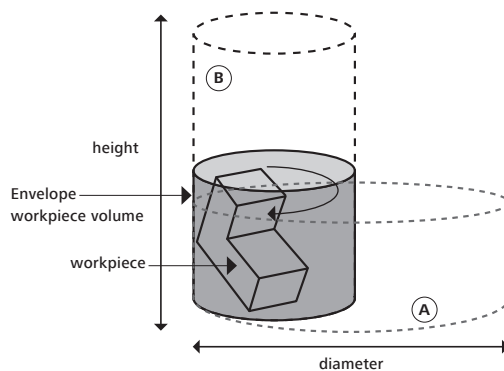
ZEISS METROTOM				1 ¹⁾	800/130 kV	6 scout	800/225 kV HR	1500/225 kV
x axis	in mm	–			700	650	700	1150
y axis	in mm	–			270	–	270	300
z axis	in mm	–			270	390	270	600
xy table	in mm	–			–	24	–	–

Workpiece size ²⁾

ZEISS METROTOM				1	800/130 kV	6 scout	800/225 kV HR	1500/225 kV
Max. workpiece weight	in kg	5			5	5	5	50 ³⁾

Maximum fittable workpieces sizes with limitation of travel and measuring range

A) optimized for max. diameter	Diameter	in mm	200	400		320	650	770
	Height	in mm	400	255			550	1350
B) optimized for max. height	Diameter	in mm	200	300			550	615
	Height	in mm	400	620		750	800	1500



- (A) Max. fittable workpiece size optimized for maximum diameter (with limitation of travel and measuring range)
- (B) Max. fittable workpiece size optimized for maximum height (with limitation of travel and measuring range)

1) fixed position

2) The theoretical max. workpiece size is given. Given values describe the envelop cylinder when part is rotated. Sample holders are not yet considered and might reduce the given values.

3) Max. acceptable mass moment of inertia $J = 0.6 \text{ kgm}^2$ and max. acceptable breakdown torque 10 Nm.

Technical features

ZEISS METROTOM	1	800/130 kV	6 scout	800/225 kV HR	1500/225 kV
Positioning system	Design: welded steel design	Design: welded steel design with 3 linear axes	Design: 5 axis kinematics mounted on granite	Design: welded steel design with 3 linear axes	Design: welded steel design with 3 linear axes
Length measuring system	–	Electro-optical reflected light system, photoelectric, resolution 0.2 µm	Electro-optical reflected light system, photoelectric, resolution 0.01 µm	Electro-optical reflected light system, photoelectric, resolution 0.2 µm	Electro-optical reflected light system, photoelectric, resolution 0.1 µm
Protective enclosure	The ZEISS METROTOM 1 system fulfills the conditions of §21 of the Strahlenschutzverordnung (StrlSchV). It, thus, meets the technical requirements for a fully protected device.	The ZEISS METROTOM 800 system fulfills the conditions of §21 of the Strahlenschutzverordnung (StrlSchV). It, thus, meets the technical requirements for a fully protected device.	The ZEISS METROTOM 6 scout system fulfills the conditions of §21 of the Strahlenschutzverordnung (StrlSchV). It, thus, meets the technical requirements for a fully protected device.	The ZEISS METROTOM 800 (HR) system fulfills the conditions of §21 of the Strahlenschutzverordnung (StrlSchV). It, thus, meets the technical requirements for a fully protected device.	The ZEISS METROTOM 1500 system fulfills the conditions of §21 of the Strahlenschutzverordnung (StrlSchV). It, thus, meets the technical requirements for a fully protected device.
Clamping device	Changer pallet on rotary table with 170 mm diameter	Changer pallet on rotary table with 170 mm diameter	Changer pallet on rotary table with 210 mm diameter	Changer pallet on rotary table with 170 mm diameter	Changer pallet on rotary table with 300 mm diameter

Environmental requirements ³⁾

ZEISS METROTOM	1	800/130 kV	6 scout	800/225 kV HR	1500/225 kV
Relative humidity	40 % - 70 %	40 % - 70 %	40 % - 70 %	40 % - 70 %	40 % - 70 %
Measuring reference temperature	18 °C - 22 °C	18 °C - 22 °C	18 °C - 22 °C	18 °C - 22 °C	18 °C - 22 °C
	per day	2.0 K/d	2.0 K/d	2.0 K/d	2.0 K/d
	per hour	1.0 K/h	1.0 K/h	1.0 K/h	1.0 K/h
	spatial	1.0 K/m	1.0 K/m	1.0 K/m	1.0 K/m

Requirements for operational readiness

ZEISS METROTOM	1	800/130 kV	6 scout	800/225 kV HR	1500/225 kV
Relative humidity	40 % - 70 %	40 % - 70 %	40 % - 70 %	40 % - 70 %	40 % - 70 %
Ambient temperature	15 °C - 30 °C	15 °C - 35 °C	15 °C - 30 °C	15 °C - 35 °C	15 °C - 35 °C
Power rating	Power supply: 220/340/374/400/440/484 V ~ (+5%) Type of current: L1/L2/L3/(N)/PE Frequency: 50 bis 60 Hz (±3,5%) Max. power consumption: 6 kVA Typ. energy demand: 4 kWh Heat emission for typ. energy demand: 4 kW Fuse at: 3 x 340-484V: C 16 A Fuse at: 3 x 220V: C 25 A	Power supply: 100/110/120/125/230/240 V ~ (+10%) Type of current: 1/N/PE Frequency: 50 - 60 Hz (+3.5%) Max. power consumption: 2.5 kVA Typ. energy demand: 1kWh (typically energy demand depends on installed hardware) Heat emission for typ. energy demand: 1 kW Fuse: C 25 A	Power supply: 3x220/340/374/400/440/484 V ~ (+5%) Type of current: L1/L2/L3/(N)/PE Frequency: 50 bis 60 Hz (±3,5%) Max. power consumption: 5 kVA Typ. energy demand: 2.5-3 kWh Heat emission for typ. energy demand: 3 kW Fuse: C 16 A	Power supply: 400/230 V ~ (+10%) Type of current: 3/N/PE Frequency: 50 - 60 Hz (+3.5%) Max. power consumption: 6.2 kVA Typ. energy demand: 1.5-2.5 kWh (typically energy demand depends on installed hardware) Heat emission for typ. energy demand: 2.5 kW Fuse: C 32 A	Power supply: 400/230 V ~ (+10%) Type of current: 3/N/PE Frequency: 50 - 60 Hz (+3.5%) Max. power consumption: 6.2 kVA Typ. energy demand: 1.5-2.5 kWh (typically energy demand depends on installed hardware) Heat emission for typ. energy demand: 2.5 kW Fuse: C 32 A

Approvals

Regulations ZEISS METROTOM 1, ZEISS METROTOM 800, ZEISS METROTOM 6 scout and ZEISS METROTOM 1500 complies with EC machine directive 2006/42/EC, EMC directive 2014/30/EU. IEC/EN 61010-2-091, CFR 1020.40. ZEISS METROTOM 800/130 kV additionally cCSAus-authorization.



Disposal ZEISS products and packaging returned to us are disposed of in accordance with applicable legal provisions.

Certifications/accreditations

Quality management system	ISO 9001:2015
Environmental management system	ISO 14001:2015
Occupational health & safety management systems	ISO 45001:2018 ²⁾
Accredited	ISO / IEC 17025 ³⁾

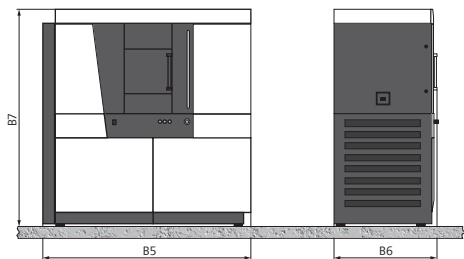
1) To ensure specified accuracies.

2) NS OHSAS 18001 will be replaced by ISO 45001 during 2020.

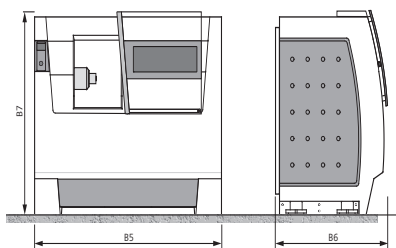
3) Does not apply to ZEISS METROTOM 6 scout and ZEISS METROTOM 1

Sizes	Dimensions in mm			Weight in kg
	Overall machine dimensions			
	Width	Length	Height	
ZEISS METROTOM	B6	B5	B7	
1	870	1750	1820	2100
800/130 kV	1310	2190	1960	5950
6 scout	1230	2200	2210	4800
800/225 kV HR	1820	3200	2050	5000
1500/225 kV	1810	3700	2440	6600

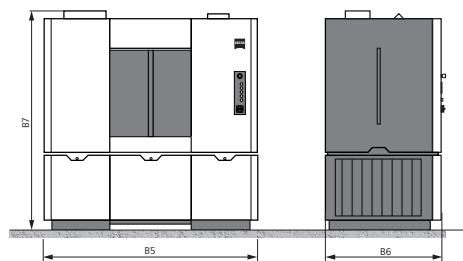
ZEISS METROTOM 1



ZEISS METROTOM 800/130 kV



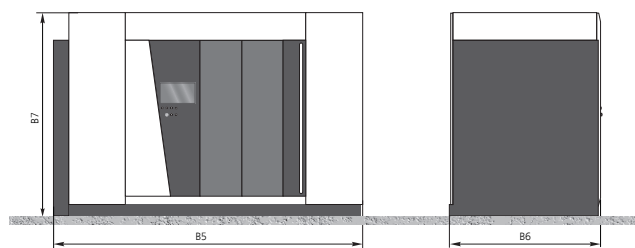
ZEISS METROTOM 6 scout



ZEISS METROTOM 800/225 kV HR



ZEISS METROTOM 1500/225 kV



Note: the given dimensions and weights are approximate values. Subject to change.
Actual appearance of specific sizes may vary from illustration. Dimensioning based on DIN 4000-167:2009. .

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