

# HDS7000 Laser Scanner

## Ultra-High Speed with Extended Range

> 1 million  
points/sec

> 180 m  
range



### Ultra-high speed laser scanner for demanding professionals

#### Highest overall performance for phase-based scanners

Phase-based scanning is known for ultra-high scan speeds that can fit detailed scene capture into short time windows and increase overall field productivity. The HDS7000 scanner adds key “next level” performance features – important for demanding professionals – to its > 1 million points/second ultra-high speed scanning.

#### Better quality data over longer ranges

Regardless of scan speed, demanding professionals don't compromise on accuracy. Advances in the HDS7000 laser technology now enable users to achieve high quality data at longer range. The HDS7000's maximum range of 187m is best-in-class for phase-based scanners.

#### Ultra-high speed scanning in more environments

Demanding professionals need their tools to work in demanding environments. The HDS7000 delivers an unmatched 55°C operating temperature range (-10°C to +45°C). Same for operating in dusty or wet locations: HDS7000's IP53 rating and a “encapsulated mirror” design provides further reassurance. HDS7000 even lets you scan on sites where only instruments with a Class 1 laser safety rating are allowed – better than any other phase-based scanner.

#### All-in-one design includes more control & registration options

Users have three scanner control options. A side panel allows touch control and optional wireless control allows “touch-free” operation. For full 3D viewing, scan measurement, and rigorous quality assurance (QA), demanding users can opt for powerful laptop control with Leica Cyclone SCAN, the industry's most popular control software.

- when it has to be **right**

**Leica**  
Geosystems

# HDS7000

## Product Specifications

General	
<b>Instrument type</b>	Compact, phase-based, dual-axis compensated, ultra-high speed laser scanner, with survey-grade accuracy, range, field-of-view and laser plummet
<b>User interface</b>	Onboard control, notebook or tablet PC, PDA
<b>Scanner drive</b>	Servo motor
<b>Data storage</b>	Integrated flash drive or external USB flash drive
<b>Camera</b>	No integrated camera; supports use of external camera

Laser Scanning System																					
<b>Type</b>	Phase-shift																				
<b>Wavelength</b>	1.5 µm (Invisible)																				
<b>Laser Class</b>	1 (in accordance with IEC 60825-1 resp. EN 60825-1)																				
<b>Range</b>	187 m ambiguity interval 0.3 m minimum range 0.1 mm resolution																				
<b>Linearity error<sup>1</sup></b>	≤1 mm																				
<b>Spot size</b>	~3.5 mm @ 0.1 m distance (Gaussian-based)																				
<b>Beam divergence</b>	< 0.3 mrad																				
<b>Scan rate</b>	Up to 1,016,727 points/sec, maximum instantaneous rate																				
<b>Range noise</b>	<table border="1"> <thead> <tr> <th>Range</th> <th>Black 14%</th> <th>Gray 37%</th> <th>White 80%</th> </tr> </thead> <tbody> <tr> <td>10 m<sup>12</sup></td> <td>0.5 mm rms</td> <td>0.4 mm rms</td> <td>0.3 mm rms</td> </tr> <tr> <td>25 m<sup>12</sup></td> <td>1.0 mm rms</td> <td>0.6 mm rms</td> <td>0.5 mm rms</td> </tr> <tr> <td>50 m<sup>12</sup></td> <td>2.7 mm rms</td> <td>1.2 mm rms</td> <td>0.8 mm rms</td> </tr> <tr> <td>100 m<sup>123</sup></td> <td>10 mm rms</td> <td>3.8 mm rms</td> <td>2.0 mm rms</td> </tr> </tbody> </table>	Range	Black 14%	Gray 37%	White 80%	10 m <sup>12</sup>	0.5 mm rms	0.4 mm rms	0.3 mm rms	25 m <sup>12</sup>	1.0 mm rms	0.6 mm rms	0.5 mm rms	50 m <sup>12</sup>	2.7 mm rms	1.2 mm rms	0.8 mm rms	100 m <sup>123</sup>	10 mm rms	3.8 mm rms	2.0 mm rms
Range	Black 14%	Gray 37%	White 80%																		
10 m <sup>12</sup>	0.5 mm rms	0.4 mm rms	0.3 mm rms																		
25 m <sup>12</sup>	1.0 mm rms	0.6 mm rms	0.5 mm rms																		
50 m <sup>12</sup>	2.7 mm rms	1.2 mm rms	0.8 mm rms																		
100 m <sup>123</sup>	10 mm rms	3.8 mm rms	2.0 mm rms																		
<b>Scan resolution</b>	7 pre-set spacings per table																				
Selectability	Pts/360°																				
	(vert./horiz.)																				
	Low quality <sup>6</sup>	Normal quality <sup>6</sup>	High quality <sup>6</sup>	Premium quality <sup>6</sup>																	
preview <sup>4</sup>	1250	0:13 min	0:26 min	0:52 min	1:44 min																
low	2500	0:26 min	0:52 min	1:44 min	3:24 min																
middle	5000	0:52 min	1:44 min	3:22 min	6:44 min																
high	10000	1:44 min	3:22 min	6:44 min	13:28 min																
super high	20000	3:28 min	6:44 min	13:28 min	26:56 min																
ultra high <sup>5</sup>	40000	---	13:28 min	26:56 min	53:20 min																
extremely high <sup>5</sup>	100000	---	1:21 h	2:42 h	3:24 h																
<b>Field-of-View</b>	max. 360° x 320° (horizontal/vertical)																				
<b>Scanning Optics</b>	Vertically rotating mirror on horizontally rotating base; User selectable vertical rotation speed (6.25 rps, 12.5 rps, 25 rps or 50 rps); Environmentally protected by shield																				
<b>Scan motors</b>	Direct drive, brushless																				
<b>Angular accur.</b>	125 µrad / 125 µrad (horizontal/vertical)																				
<b>Angular resol.</b>	7 µrad / 7 µrad (horizontal/vertical)																				

Miscellaneous	
<b>Onboard display</b>	Touchscreen control with stylus, full color graphic display, VGA (640 x 320 pixels)
<b>Dual-axis compensator</b>	Selectable on/off, resolution 3.6", measurement range +/- 30", accuracy < 25"
<b>Level indicator</b>	Electronic bubble in onboard control and software
<b>Laser plummet</b>	Laser class 2 (in accordance with IEC 60825-1 resp. EN 60825-1) Centering accuracy: 0.5 m / 1 m Laser dot diameter: < 1.5 mm @ 1.5 m Selectable on/off
<b>Data transfer</b>	Ethernet or USB 2.0 device (two ports)
<b>Data storage</b>	64 GB flash drive (integrated), 2 x 32 GB USB flash drive (external)
<b>Communications</b>	Ethernet or integrated Wireless LAN (WLAN)
<b>Data integrity monitoring</b>	Self-check at startup

Electrical	
<b>Power supply</b>	24 V DC, 100 - 240 V AC
<b>Power Cons.</b>	< 65W (on average)
<b>Battery Type</b>	Internal: Li-Ion
<b>Power ports</b>	Internal: 1, External: 1
<b>Duration</b>	Internal: >2.5h, AC power supply: unlimited
<b>Power status</b>	LEDs indicate charging status and capacity level

Environmental	
<b>Temperature</b>	Operating -10°C to +45°C/Storage -20°C to +50°C
<b>Lighting</b>	Fully operational between bright sunlight and complete darkness
<b>Humidity</b>	Non-condensing
<b>Dust/humidity</b>	IP53 (IEC 60529)

Physical	
<b>Scanner</b>	286 mm D x 170 mm W x 395 mm H/9.8kg, nominal
<b>Battery (internal)</b>	88 mm D x 170 mm W x 61 mm H/1.2 kg
<b>AC Power Supply</b>	167 mm D x 67 mm W x 35 mm H/0.54kg

Standard Accessories Included	
Scanner and accessory transport case	
2x 32 GB USB memory stick, 1x USB plug	
Additional rechargeable intergrated battery	
Charging/power cable, Ethernet cable, A/C cable	
Battery charger/AC power supply	
Battery charging cradle for internal battery	
Cleaning kit	
Cyclone™ SCAN software	
1 year CCP Basic support agreement	

Hardware Options	
Notebook PC, Tablet PC, or PDA	
HDS scan targets and target accessories	
Service agreement for HDS7000	
Extended warranty for HDS7000	
External camera kit (third party product)	
External battery	
Tripod, tripod star, rolling base	

Notebook PC for scanning with Cyclone software <sup>Δ</sup>	
<b>Component</b>	<b>required (minimum)</b>
Processor	1.7 GHz Pentium M or similar
RAM	1 GB or greater (2 GB for Windows Vista)
Network card	Ethernet
Display	SVGA or OpenGL accelerated graphics card (with latest drivers)
Operating system	Windows XP Professional (SP2 or higher) (32 or 64) Windows Vista (32 or 64), Windows 7 (32 or 64)

Control Options	
Full colour touch screen for onboard scan control	
Leica Cyclone SCAN software (see Cyclone SCAN data sheet for full list of features)	
Web browser	

Ordering Information	
Contact Leica Geosystems or authorized representatives	

All specifications are subject to change without notice.  
All accuracy specifications are one sigma unless otherwise noted.

<sup>1</sup> Detailed explanation on request

<sup>2</sup> Data rate 127000 pts/sec (equivalent to "high resolution, high quality scan),

1 sigma range noise, unfiltered raw data

<sup>3</sup> All values extrapolated

<sup>4</sup> "Preview" resolution not recommended for exact measurements, only for positioning higher resolution scan selections

<sup>5</sup> Only recommended for scan selections because of enormous amount of data

<sup>6</sup> Doubling ("low quality") and halving ("high quality") the data rate (pixel/sec.) theoretically increases the range noise on each pixel by 40% ("low quality") or decreases it by 40% ("high quality") compared to "normal quality". Depending on the roughness of the surface measured, in reality this difference could be less, especially when scanning objects with a bright surface at short distances, e.g. indoors

<sup>Δ</sup> Minimum requirements for modeling operations are different.

Refer to Cyclone data sheet specifications

Windows is a registered trademark of Microsoft Corporation. Other trademarks and trade names are those of their respective owners.

Illustrations, descriptions and technical specifications are not binding and may change.  
Printed in Switzerland – Copyright Leica Geosystems AG, Heerbrugg, Switzerland 2011.  
789094en – III.11 – RDV