

# Leica HDS6000

## A new generation of ultra-high speed laser scanner

See also  
HDS6000  
brochure!



### Compact design and high-performance scanning optimize field productivity

#### Leica HDS6000: new standard for phase-based scanners

The “next-generation” Leica HDS6000 significantly reduces field costs and increases phase-based data quality for many types of as-built and site surveys where users want to take advantage of ultra-high speed, phase-based laser scanning.

#### Up to 500,000 points per second

The Leica HDS6000 features the fastest scan rates available for high-accuracy, as-built surveys, making it the ideal instrument when very short time windows are available for capturing High-Definition Survey™ data.

#### Highly portable and field-efficient

By integrating the scanner, data storage, scanner control, and batteries into a single unit, the Leica HDS6000 is easy to setup and carry for fast project execution.

In addition, its increased range (up to 79m for 90% surface reflectivity), improved accuracy, and dual-axis (tilt) sensing capability can reduce the number of instrument and target setups needed, further cutting field time. These same features also increase the versatility of phase-based scanning.

#### Flexible scan control & registration options

Users can choose from three scanner control options. A side touch panel allows simple control. An optional wireless PDA allows “touch-free” control, plus visual inspection of jpeg scan images. For full 3D viewing, scan measurement, and rigorous quality assurance (QA), users can opt for powerful laptop control with Leica Cyclone SCAN, the industry’s most popular and versatile scanner control software. For accurately registering (or stitching) multiple scans together, Leica Cyclone REGISTER software lets Leica HDS6000 users take advantage of either scan targets or “cloud-to-cloud” registration methods that don’t require targets.

- when it has to be **right**

**Leica**  
Geosystems

# Leica HDS6000

## Product Specifications

General	
<b>Instrument type</b>	Compact, phase-based, dual-axis sensing, ultra high-speed laser scanner, with survey-grade accuracy and full field-of-view
<b>User interface</b>	Onboard touch panel, or external notebook or Tablet PC, or PDA
<b>Scanner drive</b>	Servo motor
<b>Data storage</b>	Integrated hard drive
<b>Camera</b>	No integrated camera; Cyclone SCAN supports use of external camera

System Performance	
Accuracy of single measurement	
Position*	6mm, 1m to 25m range; 10mm to 50m range
Distance*	≤4mm at 90% albedo up to 25m; ≤5mm at 18% albedo up to 25m; ≤5mm at 90% albedo up to 50m; ≤6mm at 18% albedo up to 50m
Angle (horizontal/vertical)	125 µrad/125 µrad, one sigma
<b>Modeled surface precision**/noise</b>	2mm at 25m; 4mm at 50m for 90% albedo, one sigma; 3mm at 25m; 7mm at 50m, for 18% albedo, one sigma

<b>Target acquisition***</b>	2mm std. deviation
<b>Dual-axis sensor</b>	Selectable on/off; 3.6" resolution
<b>Data integrity monitoring</b>	Self-check at start-up; optional checks using Cyclone-SCAN

Laser Scanning System	
<b>Type</b>	Phase-shift
<b>Laser Class</b>	3R (IEC 60825-1)
<b>Range</b>	79m ambiguity interval 79m @90%; 50m @18% albedo
<b>Scan rate</b>	Up to 500,000 points/sec, maximum instantaneous rate; Average time: see "Selectability Table" below

Scan resolution															
Spot size	3mm at exit (based on Gaussian definition) + 0.22mrad divergence; 8mm @25m; 14mm @50m														
Selectability	5 pre-set spacings per table														
	<table border="1"> <tr> <th>Pts/360°</th> <th>Scan time</th> </tr> <tr> <td>(vert., horiz.)</td> <td>(full dome)</td> </tr> <tr> <td>"Preview"</td> <td>1250 25 sec</td> </tr> <tr> <td>Middle (4x)</td> <td>5000 1 min 40 sec</td> </tr> <tr> <td>High (8x)</td> <td>10000 3 min 22 sec</td> </tr> <tr> <td>Super High (16x)</td> <td>20000 6 min 44 sec</td> </tr> <tr> <td>Ultra High (32x)</td> <td>40000 26 min 40 sec</td> </tr> </table>	Pts/360°	Scan time	(vert., horiz.)	(full dome)	"Preview"	1250 25 sec	Middle (4x)	5000 1 min 40 sec	High (8x)	10000 3 min 22 sec	Super High (16x)	20000 6 min 44 sec	Ultra High (32x)	40000 26 min 40 sec
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Point spacing at range	@10m	@50m
"Preview"	50.6x50.6mm	250x250mm
Middle (4x)	12.6x12.6mm	62x62mm
High (8x)	6.3x6.3mm	31.4x31.4mm
Super High (16x)	3.1x3.1mm	15.8x15.8mm
Ultra High (32x)	1.6x1.6mm	7.9x7.9mm

Field-of-view (per scan)	
Horizontal	360° (maximum)
Vertical	310° (maximum)
Aiming/Sighting	Optical horizontal sighting using QuickScan™ feature

<b>Scanning Optics</b>	Vertically rotating mirror on horizontally rotating base; Environmentally protected by shield
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<b>Scan motors</b>	Direct drive, brushless; proprietary
<b>Power transfer</b>	Onboard rotating turret or external to non-rotating base
<b>Data transfer</b>	Ethernet or USB 2.0 device (two ports)

<b>Data storage capacity (onboard)</b>	60 GB, min
<b>Communications</b>	DHCP client/server; Ethernet or Bluetooth
<b>Status indicators</b>	4-line alphanumeric display for laser status, system power & status 1 LED for laser status
<b>Level indicator</b>	External bubble; digital readout on touch panel or via laptop

Electrical	
<b>Power supply</b>	24V DC; 90 - 260V AC
<b>Power Consumption</b>	50 W
<b>Battery Type</b>	Integrated: Li-ion External: sealed lead acid Internal: 1.5 hrs, typical External: 4 hrs, typical
<b>Duration</b>	

<b>Power status indicators</b>	LEDs indicate charging status and capacity levels
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Environmental	
<b>Operating temp.</b>	0° C to +40° C
<b>Storage temp.</b>	-20°C to +50°C
<b>Lighting</b>	Fully operational between bright sunlight and complete darkness
<b>Humidity</b>	Non-condensing

Physical	
<b>Scanner</b>	
Dimensions	7.5"D x 9.6" W x 13.8" H 190mm D x 244mm W x 351.5mm
Weight	14 kg, nominal (includes integrated battery)

<b>Battery (external)</b>	
Dimensions	9.5" D x 10" W x 12" H 240mm D x 260 mm W x 300mm H
Weight	16 kg, nominal
<b>AC Power Supply</b>	
Dimensions	9.5" D x 5" W x 6" H 240mm D x 127 mm W x 152mm H
Weight	2.5 kg, nominal

Standard Accessories	
Scanner and accessory carrying case Additional rechargeable integrated battery Charging/power cable, ethernet cable, A/C cable Battery charger / A/C power supply Battery charging cradle for internal battery Cyclone™-SCAN software Cleaning kit	

Hardware Options	
Notebook PC, Tablet PC, or PDA HDS6000 scan targets and target accessories Service agreement for Leica HDS6000 Extended warranty for Leica HDS6000 Tribrach (Leica Professional Series) Survey tripod (Leica Professional Series) External battery	

Notebook PC for scanning Δ	
<b>Component</b>	<b>required (minimum)</b>
Processor	1.7 GHz Pentium M or similar
RAM	1024MB SDRAM
Network card	Ethernet
Display	SXGA+ (64 MB or greater video RAM rec.)
Operating system	Windows XP Professional (SP1 Or higher) Windows 2000 (SP3 or higher with up to date security patches)

PDA for scanning (rec.)	
HP iPAQ Pocket PC Series Windows Mobile 5.0 for Pocket PC; iPAQ Wireless application; Bluetooth wireless technology	

Cyclone-SCAN	
Scan density control from five (5) pre-sets Scan filters: range, intensity <sup>1</sup> Scan speed control (default or low) Laser power control (normal or low/close-in) Selection of scan area via scribed rectangle or pre-sets <sup>1</sup> Customizable longitude/latitude grid lines Pre-scan range probe Script management for auto scan sequencing <sup>1</sup> View scanner locations and field-of-view Level of detail (LOD) for fast visualization Auto rechecking (re-acquisition) of targets <sup>1</sup> Target identification Traverse <sup>2</sup> ; traverse & resection reports Field Setup - Resection; Known Backsight; Known Azimuth <sup>1</sup> Direct coordinate/station entry <sup>1</sup> Dual-axis sensor on/off Stakeout and ID point Target and instrument height input Support of external digital images Fly-around, pan & zoom, rotate clouds, meshes, models in 3D View point clouds with intensity or true-color mapping Point-and-scan QuickScan to set horizontal FoV <sup>1</sup> User-defined quality-of-fit checks Measure & dimension: slope dist., ΔX, ΔY, ΔZ Create, manage annotations and layers Save/restore views; save screen images; undo/redo support	

Onboard touch panel control	
Vertical, horizontal FOV Scan density: 5 levels Dual-axis sensor on/off Laser power setting for normal or close-in mode	

PDA control	
Vertical, horizontal FOV Scan density: 5 levels Dual-axis sensor on/off Laser power setting for normal or close-in mode Display jpeg thumbnail of scan image	

Direct Import Formats	
Cyclone native IMP object database format, Cyclone Object ASCII point data (XYZ, SVY, PTS, PTX, TXT); Leica's X-Function DBX format, LandXML, ZFS, ZFC, 3DD	

Direct Export Formats	
ASCII point data (XYZ, SVY, PTS, PTX, TXT); Leica's X-Function DBX format, LandXML, PTZ	

Indirect Export Formats	
AutoCAD (via COE for AutoCAD plug-in) MicroStation (via COE for MicroStation plug-in) PDS (via MicroStation, COE for MicroStation plug-in) AutoPLANT (via AutoCAD, COE for MicroStation plug-in)	

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> SmartScan™ technology feature  
Δ Minimum requirements for modeling operations are different. Refer to Cyclone data sheet specifications.  
\* At 1m - 50m range, one sigma  
\*\* One sigma; subject to modeling methodology for modeled surface  
\*\*\* Algorithmic fit to planar HDS gray & white targets

Laser class 3R in accordance with IEC 60825-1 resp. EN 60825-1  
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