

# Leica Viva GNSS GS10 receiver Datasheet



## Proven GNSS technology

Built on years of knowledge and experience, the Leica GS10 delivers the hallmarks of Leica GNSS – reliability and accuracy.

- SmartCheck – RTK data-processing to guarantee correct results
- SmartTrack – advanced four constellation tracking of all GNSS satellites today and tomorrow
- SmartRTK – delivers consistent results in all networks



## Work as you want to

The Leica GS10 is designed to suit any surveying task.

- Exchangeable communication devices for field base stations and RTK rovers with removable SIM cards
- Fully scalable sensor allows you to buy only what you need today and upgrade with additional functionality as you need it
- Integrated web server to configure the logging of Leica or RINEX raw data and measure with one button press in the field

**IP67**

## Rugged

The Leica GS10 is built for the most demanding environments.




- IP67 protection against dust and immersion to 1 m
- Built for extreme temperatures of -40° C to +65° C

- when it has to be **right**

**Leica**  
Geosystems

# Technical Specifications



Leica GS10 GNSS receiver	Leica GS10 Single Frequency	Leica GS10 Basic	Leica GS10 Limited	Leica GS10 Performance	Leica GS10 Professional
<b>Supported GNSS Systems</b>					
GPS L2	○	●	●	●	●
GPS L5	○	○	○	○	●
GLONASS	○	○	○	○	●
Galileo	○	○	○	○	●
<b>RTK performance</b>					
DGPS / RTCM	○	○	●	●	●
RTK up to 5 km	○	○	●	●	●
RTK unlimited	○	○	○	●	●
Network RTK	○	○	○	●	●
Leica Lite RTK	○	○	○	○	●
<b>Position update &amp; data recording</b>					
5 Hz positioning	●	○	●	●	●
20 Hz positioning	○	○	○	●	●
Raw data logging	●	○	●	●	●
RINEX logging	○	○	○	○	●
NMEA out	○	○	○	○	●
<b>Additional features</b>					
RTK Reference Station functionality	○	○	○	●	●
● = Standard      ○ = Optional					
<b>GNSS Performance</b>					
	GNSS technology	Leica patented SmartTrack+ technology: <ul style="list-style-type: none"> <li>Advanced measurement engine</li> <li>Jamming resistant measurements</li> <li>High precision pulse aperture multipath correlator for pseudorange measurements</li> <li>Excellent low elevation tracking</li> <li>Very low noise GNSS carrier phase measurements with &lt;0.5 mm precision</li> <li>Minimum acquisition time</li> </ul>			
	No. of channels	120 channels			
	Max. simultaneous tracked satellites	Up to 60 Satellites simultaneously on two frequencies			
	Satellite signals tracking	<ul style="list-style-type: none"> <li>GPS: L1, L2, L2C, L5</li> <li>GLONASS: L1, L2</li> <li>Galileo (Test): GIOVE-A, GIOVE-B</li> <li>Galileo: E1, E5a, E5b, Alt-BOC</li> <li>Compass<sup>1</sup></li> <li>SBAS: WAAS, EGNOS, GAGAN, MSAS</li> </ul>			
	GNSS measurements	Fully independent code and phase measurements of all frequencies <ul style="list-style-type: none"> <li>GPS: carrier phase full wave length, Code (C/A, P, C Code)</li> <li>GLONASS: carrier phase full wave length, Code (C/A, P narrow Code)</li> <li>Galileo: carrier phase full wave length, Code</li> </ul>			
Reacquisition time	< 1 sec				
<b>GNSS Antennas</b>					
	<b>Standard survey antennas</b>				
	<b>Types</b>	<b>AS10</b>	<b>AS05</b>		
	GNSS technology	SmartTrack+	SmartTrack		
	Satellite signal tracking	GPS: L1, L2, L5 GLONASS, Galileo, Compass	GPS: L1 GLONASS		
	Ground plane	Built-In Ground plane	Built-In Ground plane		
	Dimensions (diameter x height)	170 mm x 62 mm	170 mm x 62 mm		
	Weight	0.44 kg	0.44 kg		
	Gain	29±3 dbi	Typically 27 dbi		
	Temperature operating	-40° C to +70° C			
	Temperature storage	-55° C to +85° C			
	Humidity	100%			
	Protection against water, sand	IP66, IP67			
	Drops & topple over	Withstands 1.5 m drop onto hard surfaces and survives topple over from a 2 m pole onto hard surfaces			
	Vibration	Withstands vibrations during operation on large civil construction machines Compliance with ISO9022-36-08 and MIL-STD 810F – 514.5-Cat24			
	<b>Choke-ring antennas</b>				
<b>Types</b>	<b>AR25</b>	<b>AT504 GG</b>			
Satellite signal tracking	GPS: L1, L2, L5 GLONASS, Galileo, Compass	GPS: L1, L2 GLONASS			
Design	Dorne Margolin, JPL design	Dorne Margolin, JPL design			
Protection radome	optional	optional			
Dimensions (diameter x height)	380 mm x 200 mm	380 mm x 140 mm			
Weight	7.6 kg	4.3 kg			
Gain	typically 40 dbi	typically 27 dbi			
<b>Measurement Performance &amp; Accuracy</b>					
	<b>Accuracy (rms) Code differential with DGPS / RTCM<sup>2</sup></b>				
	DGPS / RTCM	Typically 25 cm (rms)			
	<b>Accuracy (rms) with Real-Time (RTK)<sup>2</sup></b>				
	Standard of compliance	Compliance with ISO17123-8			
	Rapid static (phase)	Horizontal: 5 mm + 0.5 ppm (rms)			
	Static mode after initialization	Vertical: 10 mm + 0.5 ppm (rms)			
	Kinematic (phase)	Horizontal: 10 mm + 1 ppm (rms)			
	Moving mode after initialization	Vertical: 20 mm + 1 ppm (rms)			
	<b>Accuracy (rms) with Post Processing<sup>2</sup></b>				
	Static (phase) with long observations	Horizontal: 3 mm + 0.1 ppm (rms) Vertical: 3.5 mm + 0.4 ppm (rms)			
	Static and rapid static (phase)	Horizontal: 5 mm + 0.5 ppm (rms) / Vertical: 10 mm + 0.5 ppm (rms)			
	Kinematic (phase)	Horizontal: 10 mm + 1 ppm (rms) / Vertical: 20 mm + 1 ppm (rms)			
	<b>On the Fly (OTF) Initialization</b>				
	RTK technology	Leica SmartCheck+ technology			
	Reliability of OTF initialization	Better than 99,99% <sup>2</sup>			
Time for initialization	Typically 8 sec <sup>3</sup>				
OTF range	up to 50 km <sup>3</sup>				
<b>Network RTK</b>					
NetWork technology	Leica SmartRTK technology				
Supported RTK network solutions	VRS, FKP, iMAX				
Supported RTK network standards	MAC (Master Auxiliary Concept) approved by RTCM SC 104				

## Leica GS10 GNSS receiver

### Hardware



Weight & Dimensions	
Weight (GS10)	1.20 kg
Weight	5.40 kg standard RTK backpack rover including GFU RTK device, controller, batteries, pole and bracket
Dimension (GS10)	212 mm x 166 mm x 79 mm
Environmental specifications	
Temperature, operating	-40° C to +65° C, compliance with ISO9022-10-08, ISO9022-11-special, MIL STD 810F - 502.4-II, MIL STD 810F - 501.4-II
Temperature, storage	-40° C to +80° C, compliance with ISO9022-10-08, ISO9022-11-special, MIL STD 810F - 502.4-II, MIL STD 810F - 501.4-II
Humidity	100%, compliance with ISO9022-13-06, ISO9022-12-04 and MIL STD 810F - 507.4-I
Proof against: water, sand and dust	IP67 according IEC60529 and MIL STD 810F - 506.4-I, MIL STD 810F - 510.4-I and MIL STD 810F - 512.4-I Protected against blowing rain and dust Protected against temporary submersion into water (max. depth 1 m)
Vibration	Withstands strong vibration during operating, compliance with ISO9022-36-08 and MIL STD 810F - 514.5-Cat.24
Drops	Withstands 1.0 m drop onto hard surfaces
Functional shock	40 g / 15 to 23 msec, compliance with MIL STD 810F - 516.5-1 No loss of lock to satellite signal when used on a pole set-up and submitted to pole bumps up to 150 mm
Power & Electrical	
Supply voltage	Nominal 12 V DC Range 10.5 – 28 V DC
Power consumption	Typically: 3.2 W, 270 mA
Internal power supply	Recharge & removable Li-Ion battery, 4.4 Ah / 7.4 V, 2 batteries fit into receiver
Internal power supply, operation time	<ul style="list-style-type: none"> <li>• 15.00 h receiving RTK data with standard radio<sup>4</sup></li> <li>• 13.00 h transmitting RTK data with standard radio<sup>4</sup></li> <li>• 14.00 h RTK via GSM / GPRS connection<sup>4</sup> using 2 internal batteries</li> </ul>
External power supply	Rechargeable external NiMH battery 9 Ah / 12 V
Certifications	Compliance to: FCC, CE Local approvals (as IC Canada, C-Tick Australia, Japan, China)

### Memory & Data Recording



Memory	
Memory medium	Removable SD card: 1 GB
Data capacity	1 GB is typically sufficient for about GPS & GLONASS (8+4 satellites) • 280 days raw data logging at 15 s rate
Data recording	
Type of data	Onboard recording of: <ul style="list-style-type: none"> <li>• Leica GNSS raw data</li> <li>• RINEX data</li> </ul>
Recording rate	Up to 20 Hz

### User Interface



Buttons	<ul style="list-style-type: none"> <li>• ON / OFF button</li> <li>• Function button</li> </ul>
Button functionality	Function button: <ul style="list-style-type: none"> <li>• Easy switch between Rover / Base mode</li> <li>• Easy "Here" positioning functionality</li> </ul>
Led status indicator	Bluetooth®, position, RTK status, data logging, detailed power status
Additional user interface	Integrated web interface functionality provides full status indicator and configuration options

### Communications



Communication ports	2 x serial RS232 Lemo 1 x USB / RS232 Lemo 1 x 5pin Lemo external power 1 x Bluetooth® port, Bluetooth® v 2.00 + EDR, class 2
Simultaneous data links	<ul style="list-style-type: none"> <li>• Up to 3 data links can be attached and used simultaneously</li> <li>• 2 real-time output interfaces via independent ports, providing identical or different RTK / RTCM formats</li> </ul>
External data links	
Radio modems	<ul style="list-style-type: none"> <li>• Support of any suitable UHF / VHF radio with RS232 interface and operating in transparent mode</li> <li>• SatelLine3AS in Leica GFU housing, fully sealed and protected, IP67</li> <li>• Pacific Crest PDL in Leica GFU housing, fully sealed and protected, IP67</li> </ul>
GSM / UMTS(HSDPA) phone modems	<ul style="list-style-type: none"> <li>• Support of any suitable GSM / GPRS / UMTS(HSDPA) modem</li> <li>• Siemens MC75 in Leica GFU housing, Quad-Band 850 / 900 / 1800 / 1900 MHz fully sealed and protected, IP67</li> </ul>
CDMA phone modems	<ul style="list-style-type: none"> <li>• Support of any suitable CDMA modem</li> <li>• Multitech MTMMC CDMA in Leica GFU housing, Dual-Band 800 / 900 MHz, 1xRTT, fully sealed and protected, IP67</li> </ul>
Landline phone modems	<ul style="list-style-type: none"> <li>• Support of any suitable Landline phone modem</li> </ul>
Communication protocols	
Real-Time data formats for data transmission and reception	Leica proprietary formats (Leica, Leica 4G) CMR, CMR+
Real-Time data formats according RTCM standard for data transmission and reception	RTCM 2.1, RTCM 2.3, RTCM 3.0, RTCM 3.1
NMEA output	NMEA 0183 V 2.20 and Leica proprietary

<sup>1</sup> The Compass signal is not finalized, although, test signals have been tracked in a test environment. As changes in the signal structure may still occur, Leica Geosystems cannot guarantee full Compass compatibility.

<sup>2</sup> Measurement precision, accuracy and reliability are dependent upon various factors including number of satellites, geometry, obstructions, observation time, ephemeris accuracy, ionospheric conditions, multipath etc. Figures quoted assume normal to favorable conditions. Times required are dependent upon various factors including number of satellites, geometry, ionospheric conditions, multipath etc. GPS and GLONASS can increase performance and accuracy by up to 30% relative to GPS only. A full Galileo and GPS L5 constellation will further increase measurement performance and accuracy.

<sup>3</sup> Might vary due to atmospheric conditions, signal multipath, obstructions, signal geometry and number of tracked signals.

<sup>4</sup> Might vary with temperatures, age of battery, transmit power of data link device.

Whether you want to stake-out an object on a construction site or you need accurate measurements of a tunnel or a bridge; whether you want to determine the area of a parcel of land or need the position of a power pole or to capture objects for as-built maps – you need reliable and precise data.

Leica Viva combines a wide range of innovative products designed to meet the daily challenges for all positioning tasks. The simple yet powerful and versatile Leica Viva hardware and software innovations are redefining state-of-the-art technology to deliver maximum performance and productivity. Leica Viva gives you the inspiration to make your ambitious visions come true.

**When it has to be right.**

**Swiss Technology**  
by Leica Geosystems



**Total Quality Management – our commitment to total customer satisfaction.**

The **Bluetooth®** word mark and logos are owned by Bluetooth SIG, Inc. and any use of such marks by Leica Geosystems AG is under license. Other trademarks and trade names are those of their respective owners.

SD is a trademark of the SD Card Association.

Illustrations, descriptions and technical data are not binding. All rights reserved.  
Printed in Switzerland – Copyright Leica Geosystems AG, Heerbrugg, Switzerland, 2009.  
774162en – II.11 – RDV



**Leica Viva**  
Overview brochure



**Leica Viva GNSS**  
Product brochure



**Leica SmartWorx Viva**  
Product brochure



**Leica Viva LGO**  
Product brochure



**Leica Viva SmartPole**  
Product brochure