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, availability and accuracy.

- Leica SmartCheck – RTK data-processing to guarantee correct results
- Leica SmartTrack – advanced four constellation tracking guarantees most accurate signals
- Leica xRTK – delivers more positions in difficult environments

Unlimited Series

The Leica GS10 Unlimited is your safe investment for the future.

- Future proof – lean back and observe GNSS modernisation with future proof hardware
- SmartLink – bridges RTK communication gaps up to 10 minutes
- GPS, Glonass, Galileo and BeiDou provide maximum performance. Additional support of BeiDou only and Glonass only positioning.

Rugged

The Leica GS10 is built for the most demanding environments.

- IP68 protection against dust and continuous immersion
- Built for extreme temperatures of –40° C to +65° C

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- when it has to be **right**

Leica Geosystems

Technical Specifications

Leica GS10 GNSS Receiver	Leica GS10 Single Frequency	Leica GS10 Performance	Leica GS10 Professional	Leica GS10 Unlimited
Supported GNSS Systems				
GPS L2	○	●	●	●
GPS L5	○	○	●	●
GLONASS	○	●	●	●
Galileo	○	●	●	●
BeiDou	○	●	○	●
RTK Performance				
DGPS / RTCM	○	●	●	●
RTK up to 5 km	○	●	●	●
RTK unlimited	○	●	●	●
Network RTK	○	●	●	●
Leica Lite RTK	○	○	●	●
SmartLink (L-band)	○	○	○	●
Position Update & Data Recording				
5 Hz positioning	●	●	●	●
20 Hz positioning	○	●	●	●
Raw data logging	●	●	●	●
RINEX logging	○	○	●	●
NMEA out	○	○	●	●
Additional Features				
RTK Reference Station functionality	○	●	●	●

● = Standard   ○ = Optional

GNSS Performance

GNSS technology	Leica patented SmartTrack technology: • Advanced measurement engine • Jamming resistant measurements • High precision pulse aperture multipath correlator for pseudorange measurements • Excellent low elevation tracking • Very low noise GNSS carrier phase measurements with < 0.5 mm precision • Minimum acquisition time
No. of channels	120 / 500+[1] channels
Max. simultaneous tracked satellites	Up to 60 satellites simultaneously on two frequencies
Satellite signals tracking	• GPS: L1, L2, L2C, L5 • GLONASS: L1, L2 • Galileo: E1, E5a, E5b, Alt-BOC • BeiDou: B1, B2 • QZSS: L1, L2, L5[2] • L-band • SBAS: WAAS, EGNOS, GAGAN, MSAS
GNSS measurements	Fully independent code and phase measurements of all frequencies • GPS: carrier phase full wave length, Code (C/A, P, C Code) • GLONASS: carrier phase full wave length, Code (C/A, P narrow Code) • Galileo: carrier phase full wave length, Code • BeiDou: carrier phase full wave length, Code
Reacquisition time	< 1 sec
Position latency	Typically 0.02 sec

GNSS Antennas

Standard Survey Antennas

Types	AS10 (triple frequency antenna)	AS05 (single frequency antenna)
GNSS technology	SmartTrack	SmartTrack
Satellite signal tracking	GPS: L1, L2, L5 GLONASS, Galileo, BeiDou	GPS: L1,Glonass: L1, Galileo: E1, BeiDou: B1
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 / storage	−40° C to +70° C / −55° C to +85° C	
Humidity	100%	
Protection against water, sand and dust	IP68 according IEC60529 and MIL STD 810G Method 506.5 I, MIL STD 810G Method 510.5 I and MIL STD 810G Method 512.5 I	
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 810G Method 514.6-Cat24	

Choke-ring Antennas

Types	AR25
Satellite signal tracking	GPS: L1, L2, L5 GLONASS, Galileo, BeiDou
Design	Dorne Margolin, JPL design
Protection radome	Optional
Dimensions (diameter x height)	380 mm x 200 mm
Weight	7.6 kg
Gain	Typically 40 dbi

Measurement Performance & Accuracy

Accuracy (rms) Code Differential with DGPS / RTCM[3]

DGPS / RTCM	Typically 25 cm (rms)

Accuracy (rms) with Real-time-Kinematic (RTK)[3]

Standard of compliance	Compliance with ISO17123-8
Single baseline (< 30 km)	Horizontal: 8 mm + 1 ppm Vertical: 15 mm + 1 ppm
Network RTK	Horizontal: 8 mm + 0.5 ppm Vertical: 15 mm + 0.5 ppm

Accuracy (rms) with Post Processing[3]

Static (phase) with long observations	Horizontal: 3 mm + 0.1 ppm Vertical: 3.5 mm + 0.4 ppm
Static and rapid static (phase)	Horizontal: 3 mm + 0.5 ppm / Vertical: 5 mm + 0.5 ppm
Kinematic (phase)	Horizontal: 8 mm + 1 ppm / Vertical: 15 mm + 1 ppm

On-the-fly (OTF) Initialisation

RTK technology	Leica SmartCheck technology
Reliability of OTF initialisation	Better than 99,99%[3]
Time for initialisation	Typically 4 sec[4]
OTF range	Up to 70 km[2]

Network RTK

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 810G Method 502.5 II, MIL STD 810G Method 501.5 II
Temperature, storage	–40° C to +80° C, compliance with ISO9022-10-08, ISO9022-11-special, MIL STD 810G Method 502.5 I, MIL STD 810G Method 501.5 I
Humidity	100%, compliance with ISO9022-13-06, ISO9022-12-04 and MIL STD 810G Method 507.5 I
Proof against: water, sand and dust	IP68 according IEC60529 and MIL STD 810G Method 506.5 I, MIL STD 810G Method 510.5 I and MIL STD 810G Method 512.5 I Protected against blowing rain and dust Protected against temporary submersion into water (max. depth 1,4 m)
Vibration	Withstands strong vibration during operating, compliance with ISO9022-36-08 and MIL STD 810G Method 514.6-Cat.24
Drops	Withstands 1.0 m drop onto hard surfaces
Functional shock	40 g / 15 to 23 msec, compliance with MIL STD 810G Method 516.6 I 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, 6 Ah / 7.4 V, 2 batteries fit into receiver
Internal power supply, operation time	• 15.00 h receiving RTK data with standard radio[5] • 13.00 h transmitting RTK data with standard radio[5] • 14.00 h RTK via GSM / GPRS connection[5] Using 2 internal batteries
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: • Leica GNSS raw data • RINEX data
Recording rate	Up to 20 Hz

User Interface

Buttons	• ON / OFF button • Function button
Button functionality	Function button: • Easy switch between Rover / Base mode • Easy "Here" positioning functionality
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	• Up to 3 data links can be attached and used simultaneously • 2 real-time output interfaces via independent ports, providing identical or different RTK / RTCM formats

External Data Links	
Radio modems	• Support of any suitable UHF / VHF radio • Satel radio in Leica GFU housing, fully sealed and protected, IP67 • Pacific Crest PDL in Leica GFU housing, fully sealed and protected, IP67
GSM / UMTS / CDMA phone modems	• Support of any suitable GSM / GPRS / UMTS / CDMA modem • Cinterion PXS8 in Leica GFU housing, fully sealed and protected, IP67 • DynDNS service support – Base station supports up to 10 rovers via TCP/IP
Landline phone modems	• Support of any suitable landline phone modem

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, RTCM 3.2 MSM Full support of RTCM 3 Transformation Message
NMEA output	NMEA 0183 V 4.00 and Leica proprietary

[1] The Unlimited series has free future upgrade to 500+ channels.

[2] Support of QZSS is incorporated and will be provided through firmware upgrade.

[3] 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 favourable conditions. Times required are dependent upon various factors including number of satellites, geometry, ionospheric conditions, multipath etc. A full BeiDou, Galileo and GPS L5 constellation will further increase measurement performance and accuracy.

[4] Might vary due to atmospheric conditions, signal multipath, obstructions, signal geometry and number of tracked signals.

[5] 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.

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