

LEICA GRX1200 GPS Reference Station



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LEICA SYSTEM 1200

Technical Data

Leica
Geosystems

GPS-GRX1200 Technical Data

Summary Description

	GRX1200 Pro	GRX1200
Receiver type	Dual-frequency, geodetic, real-time RTK reference station receiver, professional LAN/WAN enabled.	Dual-frequency, geodetic, real-time RTK reference station receiver, standard
Summary of measuring, modes and applications	Continuously Operating Reference Station (CORS) for static, rapid static, kinematic reference applications L1 + L2, code, phase Post processing Real-time RTK reference standard DGPS/RTCM reference standard Survey, geodetic, real-Time, GIS and Monitoring applications	Continuously Operating Reference Station (CORS) for static, rapid static, kinematic reference applications L1 + L2, code, phase Post processing Real-time RTK reference standard DGPS/RTCM reference standard Survey, geodetic, real-Time, GIS and Monitoring applications

For GPS System 1200 field and rover receiver and office software technical data, please refer to LEICA GPS1200 series Technical Data sheet (Art.-No. 738 817en)

System Components

Receiver

	GRX1200 Pro	GRX1200
Receiver technology	SmartTrak - patented. Discrete elliptical filters. Fast acquisition. Strong signal. Low noise. Excellent tracking, even to low satellites and in adverse conditions. Interference resistant. Multipath mitigation.	
No. of channels	12 L1 + 12 L2	12 L1 + 12 L2
L1 measurements	Carrier phase full wave length C/A narrow code	Carrier phase full wave length C/A narrow code
L2 measurements	Carrier phase full wave length, AS off or on. P2 code / P-code aided under AS. Equal performance with AS off or on	Carrier phase full wave length, AS off or on. P2 code / P-code aided under AS. Equal performance with AS off or on
Independent measurements	Fully independent L1 and L2 code and phase measurements	Fully independent L1 and L2 code and phase measurements
Time to first phase measurement after switching ON	Typically 30 secs	Typically 30 secs
LED status indicators	3: for power, tracking, memory	
Ports	<ul style="list-style-type: none"> - Serial RS23 - Power Input - Antenna - PPS output - Event input - External frequency - Ethernet 	<ul style="list-style-type: none"> 4x LEMO-1, 8-pin, 115'200 baud 2x External LEMO -1, 5-pin / 1x Internal 1x TNC 1x LEMO HGP.00.250.CTL 1x LEMO ERN.0S.250.CTL 1x 24QMA-50-2-3/133, 5/10 Mhz 1x rugged RJ45
Ethernet Security	Individual IP-address range filter 3x access ranges per logical IP-port	

	GRX1200 Pro	GRX1200
Supply voltage	Nominal 12V DC, range 10.5-28V DC	Nominal 12V DC, range 10.5-28V DC
Power consumption	4.0W typically, 320mA	3.8W typically, 320mA
Dimensions (all receivers) : length x width x thickness	The dimensions are given for the housing without the sockets 0.212m x 0.166m x 0.079m	0.212m x 0.166m x 0.079m
Weight, receiver only	1.25kg	1.20kg

GPS Antennas

Standard geodetic antenna

AX1202, L1/L2 SmartTrack

Groundplane	Built-in groundplane
Dimensions (diameter x height)	170mm x 62mm
Weight	0.44kg
Supply voltage	Pre-amp: 4.75-15VDC, 50mA max.
Gain	typically 27 dBi
Phase centre stability	< 1mm

Choke-ring geodetic antenna

AT504 choke-ring, L1/L2 microstrip.

Design	Dorne & Margolin L1/L2 antenna element with gold anodized choke ring ground plane. Complies with IGS type 'T' antenna, JPL design.
Protection radome	optional
Dimensions (diameter x height)	380mm x 140mm (antenna)
Weight	4.3kg (antenna)
Supply voltage	Pre-amp: 4.75-15VDC, 50mA max.
Gain	typically 27 dBi
Noise Figure	3 dBi max.
BW, -3 dBi	40 MHz min.
BW, -30 dBi	200 MHz max.
Phase centre stability	< 1mm

Controller (optional)

Type	RX1210, RX1210T (with touch screen)
Display	¼ VGA, monochrome, graphics capable, illumination
Character Set	Maximum 256 characters , extended ASCII characters set
Touch screen (RX1210T only)	Toughened film on glass
Keyboard	Full alphanumeric (62 keys), 12 function keys, 6 user-definable keys, illumination
Weight	0.48kg

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Measurement Precision and Position Accuracies

Important Note	Measurement precision and accuracy in position and accuracy in height are dependent upon various factors including number of satellites, geometry, observation time, ephemeris accuracy, ionospheric conditions, multipath etc. Figures quoted assume normal to favourable conditions. Times can also not be quoted exactly. Times required are dependent upon various factors including number of satellites, geometry, ionospheric conditions, multipath etc. The following accuracies, given as root mean square, are based on measurements processed using LGO and on real-time measurements.
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Code and Phase Measurement Precision (irrespective whether AS off/on)

Carrier phase on L1 / L2	0.2mm rms / 0.2mm rms
Code (pseudorange) on L1 / L2	2cm rms / 2cm rms

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Accuracy (rms) with post processing

	With LEICA Geo Office L1/L2 processing software
Static (phase), choke ring antenna long lines, long observation time	Horizontal: 3mm + 0.5ppm Vertical: 6mm + 0.5ppm
Static and rapid static (phase) with standard antenna	Horizontal: 5mm + 0.5ppm Vertical: 10mm + 0.5ppm
Code only	Typically 25cm

Accuracy (rms) in single receiver navigation mode

Navigation accuracy	5–10m rms for each coordinate
Degradation effect	Degradation possible due to SA

Position update and latency

Position update rate	Selectable: 0.05 sec (20Hz) to 60 secs
Position latency	0.03 sec or less

Real-time RTK and DGPS/RTCM Data Formats

Transmission for Real-time RTK and DGPS	Standard
RTK Data Formats	Leica proprietary format CMR, CMR+
RTCM Formats	RTCM versions 2.x, Message types 1, 2, 3, 9, 18, 19, 20, 21, 22, 23, 24 and RTCM V3.0
Simultaneous transmissions	2 real time output interfaces via independent ports, providing identical or different RTK/RTCM formats
Time Slicing	Up to four time slots supported

Data recording

Recording rate	Selectable from 0.05 to 300 s
Standard medium	CompactFlash cards: 32MB, 256 MB
Data capacity:	32 MB is sufficient for about <ul style="list-style-type: none">36h L1 + L2 data logging at 1s rate550h L1 + L2 data logging at 15s rate 256 MB is sufficient for about <ul style="list-style-type: none">288h L1 + L2 data logging at 1s rate4400h L1 + L2 data logging at 15s rate

Power supply

External power supply unit	Up to two external power sources can be connected simultaneously. It is possible to configure one as the primary power input and the other as backup power source. An internal plug-in battery can be used for temporary set ups. Power-supply unit for GPS receiver, for indoor use only, input 100V-240VAC 50-60HZ, output 12VDC. Ideal for continuous receiver operation.
External battery	GEB171 rechargeable 8Ah/12V NiCd battery
Operation time	1 GEB171 powers receiver plus antenna for about 25hrs

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Internal battery	GEB221 rechargeable Li-Ion battery 3.8Ah/7.2V, 1 battery fits into receiver
Operation time	1 GEB221 powers receiver plus antenna for about 8 hrs
Weight, GEB221 battery	0.2kg

Receiver Control & Operation

OWI interface

Protocol Versions OWI interface ports	Leica proprietary Outside World Interface - OWI – for receiver control commands from PC etc, for receiver configuration, control and status, e.g. using Leica GPS Spider Binary or ASCII <ul style="list-style-type: none">All serial portsEthernet port Simultaneous access, control and message output using these ports is fully supported
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Receiver operation

Operation using OWI	Standard method, e.g. Leica GPS Spider. Receiver control, operation, data input, survey-data acquisition, information display via remote SW application using OWI command control
Built-In Status LED's RX1210 & RX1220 Controller	3 LED's indicate power, tracking, recording Can be used for receiver configuration and status information display

NMEA output

NMEA sentences	NMEA Data output format, internationally standardized format for data and position output for real-time/RTK, DGPS, navigation positions NMEA 0183 V2.20 and Leica proprietary
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Data links

No. of simultaneous data links	Support of various Radio modems and GSM/TDMA cellular mobile phones for RTK, DGPS or remote control operation modes Up to two data links can be attached simultaneously using Leica GFU housing, plus two generic data links, to be used with different sensor interfaces.
Radio modem Recommended radio modems	Or up to four generic data links can be attached simultaneously. Any suitable radio modem with RS232 interface and operating in transparent mode Satellite 3AS integrated into Leica GFU housing Pacific Crest PDL receive-only integrated into Leica GFU housing
GSM phone modem Recommended GSM phone Recommended TDMA phone	Any suitable model Siemens MC45 mobile phone integrated into Leica GFU housing Sony-Ericson DM25 mobile phone integrated into Leica GFU housing
Landline phone modem	Any suitable model

Environmental specifications

Receivers	GRX1200 Pro	GRX1200
Temperature, operating	-40°C to +65°C * Compliance with ISO9022-10-05, ISO9022-11-special and MIL-STD-810F, Method 502.4-II, MIL-STD-810F, Method 501.4-II * When using the Ethernet port: 0°C to +45°C Compliance with : ISO9022-10-01, ISO9022-11-special	-40°C to +65°C Compliance with ISO9022-10-08, ISO9022-11-special and MIL-STD-810F, Method 502.4-II, MIL-STD-810F, Method 501.4-II
Temperature, storage	-40°C to +70°C Compliance with ISO9022-10-05, ISO9022-11-05 and MIL-STD-810F, Method 502.4-I, MIL-STD-810F, Method 501.4-I	-40°C to +80°C Compliance with ISO9022-10-08, ISO9022-11-special and MIL-STD-810F, Method 502.4-I, MIL-STD-810F, Method 501.4-I
Valid for GRX1200 and GRX1200 Pro		
Humidity	Up to 100%* Compliance with ISO9022-13-06, ISO9022-12-04 and MIL-STD-810F Method 507.4-I * The effects of condensation are to be effectively counteracted by periodically drying out the product	
Protection against Water, Sand and Dust	IP67 Protection against blowing rain Waterproof to temporary submersion into water (maximum depth of 1m) Dust-tight, protection against blowing dust Compliance with IP67 according IEC60529 and MIL-STD-810F Method 506.4-I, MIL-STD-810F Method 510.4-I, MIL-STD-810F Method 512.4-I	
Drops	Withstands 1m drop onto hard surfaces	
Vibration	Compliance with ISO9022-36-08 and MIL-STD-810F Method 514.5-Cat24	
Valid for AX1201, AX1202		
Temperature, operating	-40°C to +70°C Compliance with ISO9022-10-08, ISO9022-11-05 and MIL-STD-810F, Method 502.4-II, MIL-STD-810F, Method 501.4-II	
Temperature, storage	-55°C to +85°C Compliance with ISO9022-10-08, ISO9022-11-06 and MIL-STD-810F, Method 502.4-II, MIL-STD-810F, Method 501.4-II	
Humidity	Up to 100%* Compliance with ISO9022-13-06, ISO9022-12-04 and MIL-STD-810F Method 507.4-I * The effects of condensation are to be effectively counteracted by periodically drying out the product	
Protection against Water, Sand and Dust	IP66 Protection against water jets IP67 Protection against blowing rain Waterproof to temporary submersion into water (maximum depth of 1m) Dust-tight, protection against blowing dust	

Drops	Compliance with IP66 and IP67 according IEC60529 and MIL-STD-810F Method 506.4-I, MIL-STD-810F Method 510.4-I, MIL-STD-810F Method 512.4-I
Vibration	Withstands 1.5m drop onto hard surfaces Withstands vibrations during operation on large civil construction machines Compliance with ISO9022-36-08 and MIL-STD-810F Method 514.5-Cat24
Functional Shock	No loss of lock to satellite signal when used on a pole set-up and submitted to pole bumps up to 150mm
Topple over pole	Survives topple over from a 2m survey pole onto hard wood on a concrete floor
Valid for AT504	
Temperature, operating	-40°C to +70°C Compliance with ISO9022-10-08, ISO9022-11-05 and MIL-STD-810F, Method 502.4-II, MIL-STD-810F, Method 501.4-II
Temperature, storage	-40°C to +70°C Compliance with ISO9022-10-08, ISO9022-11-06 and MIL-STD-810F, Method 502.4-I, MIL-STD-810F, Method 501.4-I
Humidity	Up to 92%* Compliance with ISO9022-12-04 and MIL-STD-810F Method 507.4-I * The effects of condensation are to be effectively counteracted by periodically drying out the product
Protection against Water, Sand and Dust	IP57 Protection against blowing rain Waterproof to temporary submersion into water (maximum depth of 1m) Dust-protected tight Compliance with IP57 according IEC60529

LEICA GPS Spider – Reference Station software

For LEICA GPS Spider Reference Station software description and technical specifications please refer to the LEICA GPS Spider software brochure (Art.-No. 737172en)

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