Leica GPS1200 Series
High performance GNSS System

GNSS
future proof

- when it has to be **right**

Leica Geosystems

Leica GPS1200
Supports full GNSS signals

Now with an ultra-precise GNSS (Global Navigation Satellite System) measurement engine that supports both GPS and GLONASS - benefit from up to 100 % more satellites than GPS only. Leica System 1200 receivers provide all the flexibility, power and performance needed for every type of GNSS application. Built to the toughest MIL specifications, they withstand extreme temperatures, the worst weather and the roughest site conditions.

Best GNSS and RTK technology
Fast satellite acquisition, high accuracy measurements, tracking to low elevations, the world's first phase multipath mitigation technology, jamming resistant, high up-date rate, low latency, and fast, reliable, long-range RTK.

GPS/TPS: standardized interface
Keyboard and touch screen, intuitive interface, powerful data management, on-board routines and programs: all easy to use and identical for GPS and TPS.

SmartRover – extremely light weight
SmartRover weighs just 2.8kg for a complete cable free all on the pole RTK GPS rover. Work the complete day in comfort and enjoy full compatibility with SmartStation

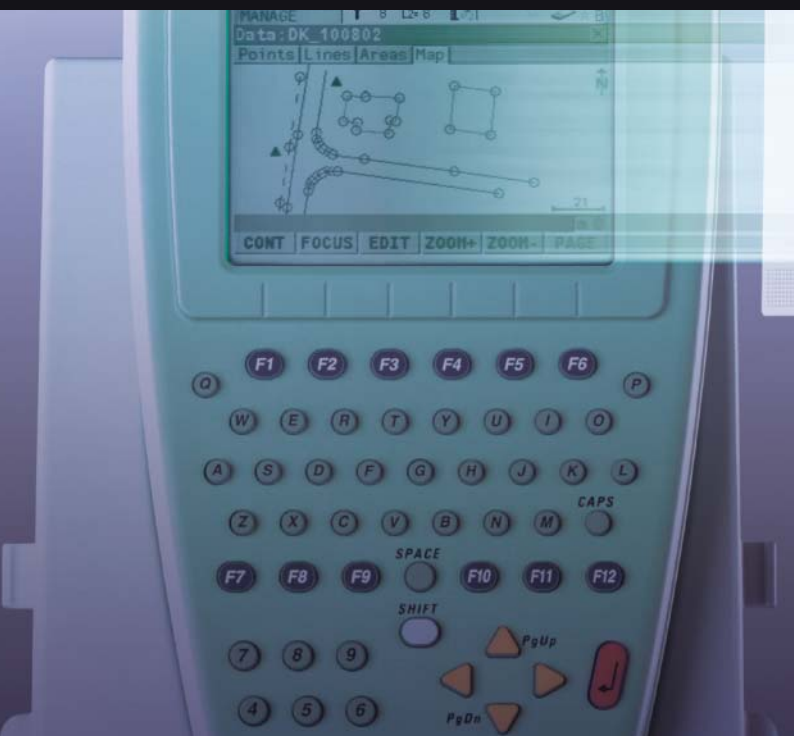
Fully waterproof, incredibly robust
GPS1200 receivers are designed to work anywhere under the roughest conditions imaginable. They float, withstand falls, jolts and vibrations, operate in rain, dust, sand and snow, at temperatures from –40°C to + 65°C.

Totally versatile
GPS1200 can be used as a reference or rover in any mode from static to RTK. Small, light, and supporting all formats and communication devices, it can be used on a pole, in a minipack, on a tripod, or even on a construction machine, survey boat or aircraft.

For all applications
You can use GPS1200 for everything: control, topo, engineering, cadastre, stake out, monitoring, seismic – whatever you want.

FUNCTION integrated

Combine GPS and TPS. Use them in the same way.
Change easily from one to the other.
Work faster, more accurately and more efficiently.
Enjoy all the freedom, flexibility and power of System 1200.



Leica SmartStation

TPS1200 with integrated GPS. All TPS1200 can be upgraded to SmartStation.

Leica GPS1200

Unites top GPS technology with powerful data management. Perfect for all GPS applications.

Leica System 1200

GPS and TPS
Working together
For all applications
Today and in the future

Designed and built to the most stringent standards with the latest measurement technologies, Leica System 1200 instruments are extremely efficient and reliable, and stand up to the severest environments.

A new, highly intuitive user interface, a multitude of functions and features, powerful data management, and user-programming capabilities are common to both System 1200 GPS and TPS instruments.

Operators can switch instantly between GPS and TPS and use whichever is the most convenient and suitable; extra training is not required.

These new high-tech GPS and TPS instruments with identical operation enable you to do every type of job, faster, more accurately and more efficiently than ever before.

And most important, you reduce your costs and increase your profits.

Leica TPS1200

Top performance, high accuracy total stations do everything you want and much more.

Uniform operating concept

Same operation for TPS and GPS. Use whichever is the most convenient.

Identical data management

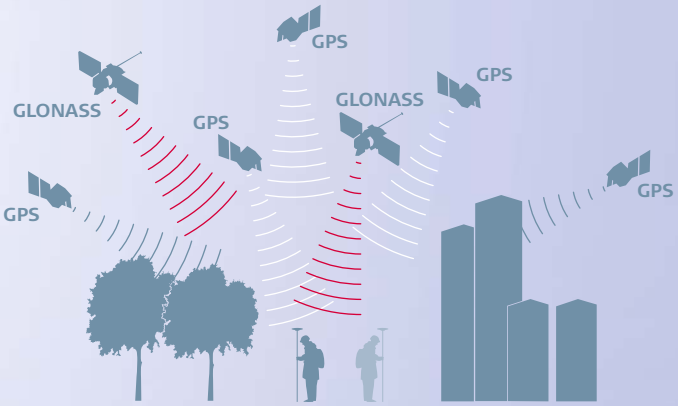
As TPS and GPS use exactly the same format and data management, you can transfer cards from one to the other and work in the same way.

Leica Geo Office

Everything you need in a single package for TPS and GPS: import, visualization, conversions, quality control, processing, adjustment, reporting, export etc.

Leica GPS1200

Fast, accurate, rugged and reliable



SmartTrack+

GNSS technology
GPS1200's SmartTrack+ measurement engine now utilizes two global navigation satellite systems increasing the number of tracked satellites. The new SmartTrack+ measurement engine tracks all available GNSS signals (L2C and GLONASS). More satellites means higher productivity, accuracy and reliability. SmartTrack+ acquires satellites within seconds, is ideal in urban canyons and obstructed areas where other receivers often fail. GPS1200 with SmartTrack+ is designed to support the future signals GPS L5 and Galileo.

SmartCheck+
Continuously checking provides the highest possible reliability. A unique, built-in integrity monitoring system checks all results immediately. SmartCheck+ now processes GPS and GLONASS measurements simultaneously for centimeter-accuracy, 20 Hz RTK at 30 km and more. Initialize within seconds and survey in obstructed areas with a GX1230/ATX1230 (GPS only) sensor or increase productivity with a GX1230 GG/ATX1230 GG (GPS and GLONASS).

GLONASS
For many years the GLONASS system was not reliable enough in terms of satellite availability and system performance. With recent launches and commitment from the Russian government, reliability and availability are significantly improved. Under normal conditions there are 2 to 5 additional satellites compared to a GPS only constellation - and even more satellites will be available over the next two years. Now is the time to invest in hybrid GNSS technology.

"The GLONASS system should be created before 2008, as it was originally planned ... We have the possibility. Let us see what can be done in 2006 – 2007"

(Russian President Vladimir Putin December 26th 2005).

Exceptionally rugged
Don't worry about how your crews handle GPS1200. It's built to MIL specs to withstand the roughest use. With its strong, precision-machined magnesium housing, GPS1200 stands up to drops and falls and the jolts and vibrations of machines.

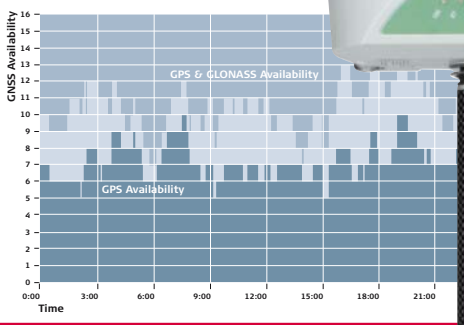
Immune to bad weather
Designed for temperatures from –40° C to +65° C (storage +80° C), GPS1200 shrugs off arctic cold and blistering heat. Fully waterproof – withstands immersion to 1 m – sand and dustproof, it operates perfectly in any conditions from tropical rainfall to desert sandstorms. GPS1200 just keeps on working.

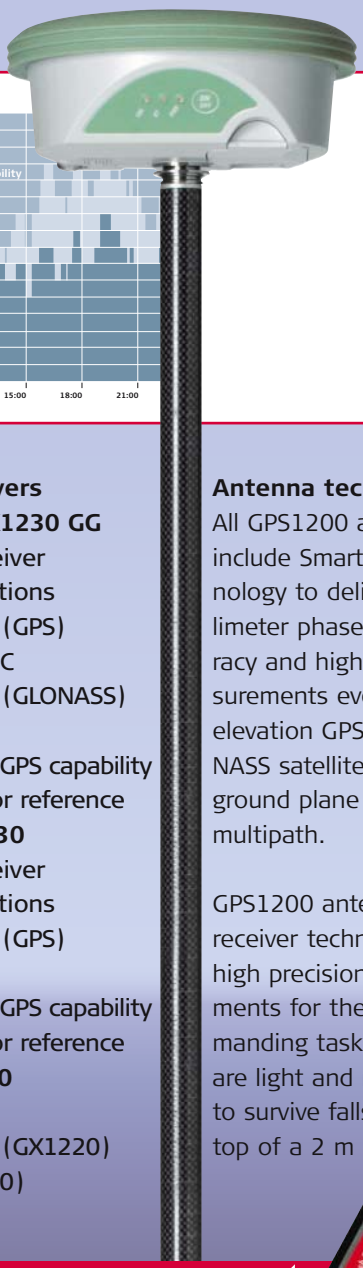
High contrast touch screen
The high quality 1/4 VGA (11 lines by 32 characters) touch screen guarantees perfect clarity and contrast. Whether in fading light or bright sunshine, you can always read the display perfectly. Operate using the touch screen or the QWERTY keyboard, whichever you prefer.

With or without controller
Connect the controller to the receiver when you need to input information and make full use of the on-board functions and programs.

RTK/DGPS communication
Radio modems, GSM, GPRS and CDMA modules fit in waterproof housings attached to the receiver. Attach either one or two devices for RTK/DGPS reference and rover applications.

With Bluetooth wireless technology built in to the RX1250 controller complete cable free operation and connectivity to compatible wireless products is available.





GPS1200 receivers

GX1230 GG/ATX1230 GG

- Universal receiver for all applications
- 14 L1 + 14 L2 (GPS)
- Support of L2C
- 12 L1 + 12 L2 (GLONASS)
- Data logging
- Full RTK and DGPS capability
- Use as rover or reference

GX1230/ATX1230

- Universal receiver for all applications
- 12 L1 + 12 L2 (GPS)
- Data logging
- Full RTK and DGPS capability
- Use as rover or reference

GX1220/GX1210

- Data logging
- 12 L1 + 12 L2 (GX1220)
- 12 L1 (GX1210)
- Option: DGPS

Antenna technology

All GPS1200 antennas include SmartTrack+ technology to deliver sub-millimeter phase center accuracy and high quality measurements even from low elevation GPS and GLONASS satellites. Built in ground plane suppresses multipath.

GPS1200 antenna and receiver technology deliver high precision measurements for the most demanding tasks. Antennas are light and rugged, built to survive falls from the top of a 2 m pole.

SmartStation with SmartAntenna

SmartStation is a TPS1200 with a ATX1230 (GG) SmartAntenna. All GPS and TPS operations are controlled from the TPS keyboard, all data are in the same database, all information is shown on the TPS screen. Touch the GPS key, let RTK determine the position to centimeter accuracy, then survey and stake out with the total station. You can do anything with SmartStation. You can also use SmartAntenna independently on a pole with a RX1250 controller.

- **Light, modular equipment**
  Use it the way that suits you best.
- **All on the pole**
  Light weight with excellent balance. Ideal for stakeout on construction sites and other demanding conditions.
- **Pole and minipack**
  Minimum weight in your hand when surveying for hours on end.
- **On a tripod or pillar**
  For geodetic control and reference stations.
- **All in the minipack**
  For 30 cm DGPS, GIS and seismic surveys.

Keyboard illumination

Switch on the display and keyboard illumination when working at night. All the keys light up.

Use GPS1200 for everything

- For RTK, DGPS,
- and static data logging
- As a rover or reference
- On a pole, tripod, pillar, or in a minipack
- On construction machines, survey boats, or planes
- For every type of application

Choice of RTK pole

Carbon fiber or aluminum pole with adjustable, ergonomic handgrip.

LEICA Geo Office

Software support package for GPS and TPS with tools and components for import, visualization, conversions, quality control, processing, adjustment, reporting, export etc.

Seamless dataflow

WORKING TOGETHER

FUNCTION integrated

LEICA SYSTEM 1200

CompactFlash cards

Same CompactFlash cards for GPS and TPS.

Plug-in Li-Ion batteries

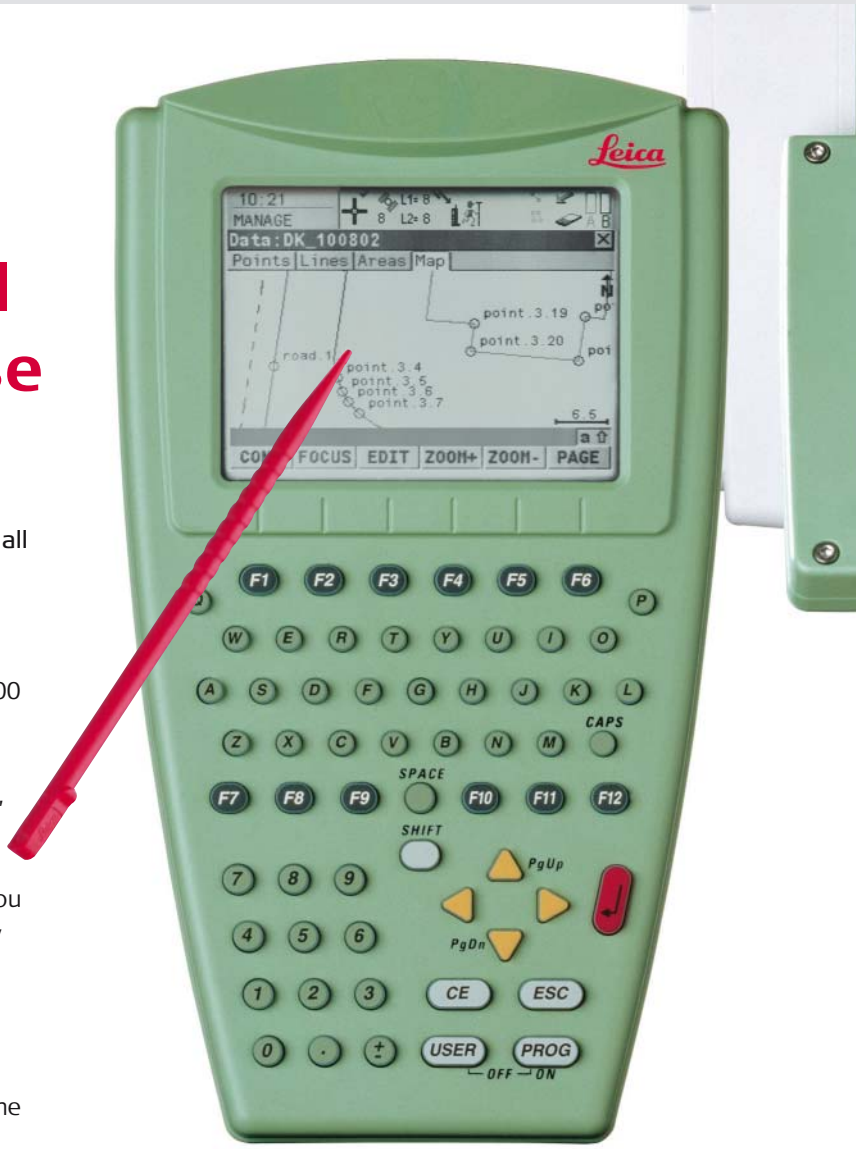
For reliable, long-lasting power, GPS1200 uses the best, high-capacity batteries available. Work for up to 15 hours with just two plug-in, Lithium-ion batteries.

TPS1200 Total Stations

GPS and TPS use the same CompactFlash cards, formats and data management. Transfer cards from one to the other and continue working in the same way.

Leica GPS1200

Extremely powerful
Yet very easy to use



GPS1200 is loaded with a multitude of features and functions to meet the many different needs of users all over the world, yet it is remarkably easy to use.

GPS1200's graphical operating concept is self-explanatory and guides you straight to what you need.

You can use the default settings or, if you prefer, you can set GPS1200 to operate, display and output data in exactly the way you require.

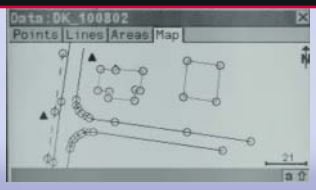
When you use GPS1200, you'll find that everything is very easy to understand.

Even better, you'll notice that GPS1200 and TPS1200 are fully compatible with the same CompactFlash cards, data management, displays and keyboards.

Depending on the jobs you do, you can switch easily from GPS to TPS and continue working in exactly the same way.

Operate GPS1200 using the QWERTY keyboard or the large graphic touch screen, whichever you prefer.

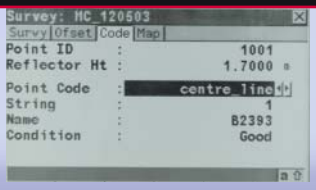
Graphic view mode



Graphic views show your work. Zoom in for details and out for the entire survey. Use the touch screen or keyboard to access data related to points and objects.

With graphical views you can check quickly in the field for completeness and correctness.

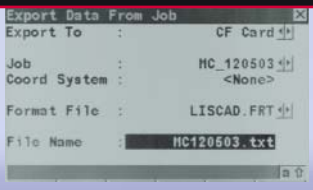
Coding and plan of your work



Define points, lines and areas to build up a plan in the display as you survey. You see immediately what you've done. Attach the codes, attributes and information needed for input into your office or mapping software.

System 1200 has all types of tools and is incredibly versatile.

Data export in any format



Data can be exported directly from GPS1200 or via Leica Geo Office in various standard formats or in your own user-defined formats for direct input into any type of processing, office, CAD or mapping software.

System 1200 interfaces easily to third-party software packages.

Status icons
Indicate the current measurement and operation modes, recording and battery status, instrument settings etc.

Definable function keys
Allocate commands, functions, displays etc. to these keys for immediate access.

Configurable user menu
Set up your own user menu for the way you and your crews operate. Show what you need and hide the rest.

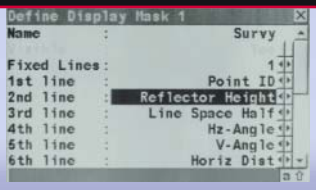
QWERTY keyboard
The standard QWERTY layout of the controller keyboard facilitates fast, easy input of alphanumeric data and information.

Program menu
Direct access to all loaded application programs such as survey, stakeout, COGO etc. and optional application programs.

Large graphic display
1/4 VGA high-resolution LCD, easy to read in any light. Display and keyboard light up for work in the dark.

Touch screen
The controller's touch screen provides immediate access without using the keyboard. You can view data and information related to points and objects and call up all types of functions directly via the screen. Use the touch screen and/or the keyboard whichever you prefer.

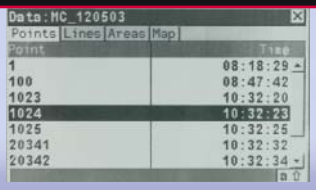
User definable displays



With GPS1200 you can define different display masks so that the system shows exactly what you and your crews want to see when surveying in the field. Set the displays according to the jobs you do and the information required.

GPS1200 adapts perfectly to your needs.

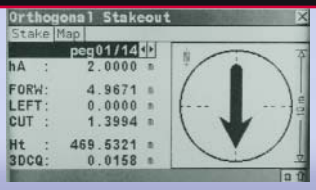
Data management



The powerful database manages data, files, jobs, quality checks etc. You can view, edit, delete, and search with or without filters. Coordinates of points measured more than once are averaged provided that they lie within specified tolerances.

Surveying is much easier and more reliable with System 1200.

Application programs



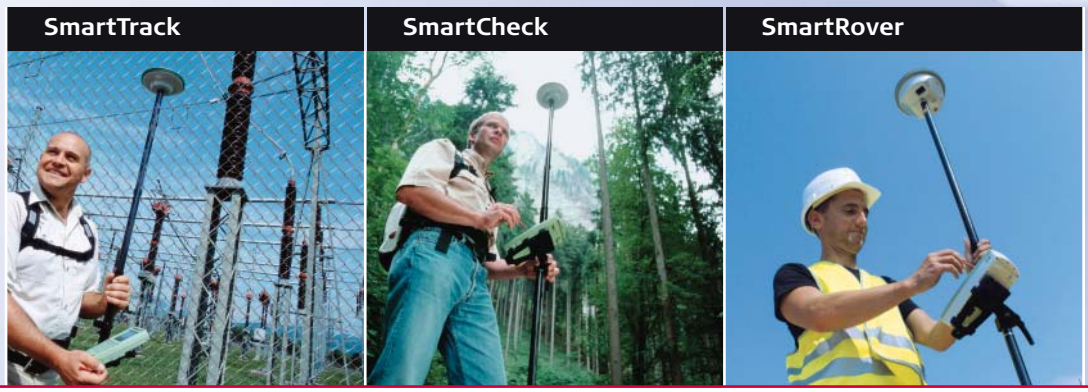
GPS1200 is supplied with many useful programs such as Survey, Stakeout, COGO. Other programs such as RoadRunner, Reference Line and DTM Stakeout are optional. You can also write your own programs for special applications in Geo C++.

Most programs run on both GPS and TPS.

WORKING TOGETHER
FUNCTION integrated
LEICA SYSTEM 1200

Leica GPS1200

Superb measurement and RTK performance



World leading GNSS technology

Low noise, reliable, high accuracy code and phase measurements are the basis of all satellite surveying work. The better the raw data and the more satellites being tracked, the better the performance and the results. GPS1200's completely new SmartTrack+ measurement engine and antenna are matched perfectly to each other for the best possible receiver performance:

- Acquisition within seconds
- Excellent signal strength
- Tracking to low elevations
- Suppresses phase and code multipath
- Jamming resistant
- Top quality GPS and GLONASS measurements
- Perfect tracking in dynamic environments
- Totally reliable

Fast, self-checking +30km RTK

The SmartCheck algorithms weight and process SmartTrack measurements and deliver fast, accurate RTK. Centimeter accuracy positions are available continuously at rates of up to 20 Hz. Integrity monitoring runs in the background resolving the ambiguities and verifying the coordinates. Reliability is phenomenal – 99.99% for baselines up to 30 km – and the range is outstanding.

Whatever the work, whether the receiver is on a pole or vehicle, you'll find GPS1200 RTK to be the perfect tool:

- Initializes within seconds
- Measures amongst trees and obstructions
- Position updates every 0.05 second (20 Hz)
- Latency less than 0.03 second
- Consistent cm-accuracy
- Total reliability

SmartRover – extremely light weight

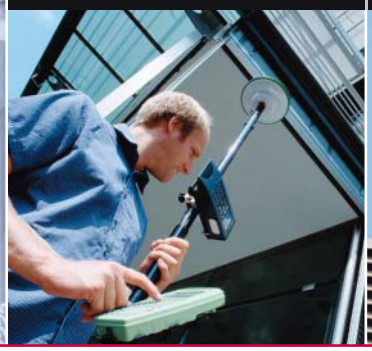
SmartRover weighs just 2.8kg for a complete cable free all on the pole RTK GPS rover. Work the complete day in comfort and enjoy full compatibility with SmartStation.

SmartRover is fully compatible with SmartStation through the interchangeable SmartAntenna. Using Bluetooth® wireless technology the new light weight RX1250 controller communicates with the SmartAntenna to provide RTK positioning to centimeter accuracy. SmartRover delivers many benefits:

- Weighs just 2.8 kg
- Interchange SmartAntenna between SmartStation and SmartRover
- Cable free all on the pole set-up is ideal for construction applications

Everything you need for all applications

Hidden points



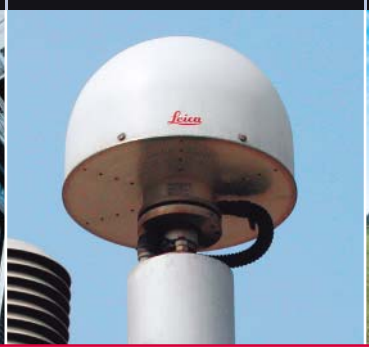
Connect a DISTO or Vector

With a Leica DISTO or Leica Vector or any other suitable handheld laser rangefinder connected to GPS1200, you can measure distances to or from objects at which it is impossible to position the antenna or acquire sufficient satellites. Using onboard COGO routines, GPS1200 computes and records the point coordinates instantly.

When carrying out detail, title or utility surveys in built up or wooded areas, there will always be points and objects, such as building corners, trees and boundary markers, which cannot be surveyed directly with GPS.

The best solution is to use the DISTO, Leica's inexpensive handheld miniature rangefinder. With the latest generation Leica DISTO plus, you can even benefit from connectivity to GPS via Bluetooth® wireless technology.

Reference stations



GPS1200 at CORS sites

Organizations in many countries are establishing GPS reference stations. GPS1200 with a SmartTrack antenna or IGS/Dorne & Margolin chokering antenna is ideal for a Continuously Operating Reference Station (CORS).
It logs data, streams data, outputs RTK and DGPS for transmission to RTK and GIS rovers, and is perfect for use with GPS SPIDER, Leica's reference station software.

As GPS1200 accepts all formats (Leica, CMR, RTCM) and outputs all standard messages (NMEA), GPS1200 RTK rovers work perfectly with all reference station services all over the world.

- With single reference stations
- With networks of stations
- With MAX and i-MAX
- With area corrections (FKP) and virtual reference stations (VRS)

SmartStation

GPS & TPS perfectly combined

TPS1200 total station with GPS SmartAntenna combined in one easy-to-use instrument. Ideal for measuring to points that cannot be occupied by an RTK rover. Eliminates need for control points, traverses and resections when using a total station. Set up SmartStation and let RTK fix the position to centimeter accuracy, then survey and stake out with the TPS. Once SmartStation is positioned, use the SmartAntenna on a pole with controller and sensor as an RTK rover.

- Use TPS and GPS together
- Fix the position with RTK, then survey with TPS
- Survey easier and faster
- Do any type of job
- Increase productivity and profits

WORKING TOGETHER

FUNCTION integrated

LEICA SYSTEM 1200

Leica GPS1200
Technical specifications and system features

GPS1200 receivers	GX1230 GG/ATX1230 GG	GX1230/ATX1230	GX1220	GX1210
GNSS technology	SmartTrack+	SmartTrack	SmartTrack	SmartTrack
Type	Dual frequency	Dual frequency	Dual frequency	Single frequency
Channels	14 L1 + 14 L2 GPS 2 SBAS 12 L1 + 12 L2 GLONASS 72 Channels	12 L1 + 12 L2 GPS 2 SBAS	12 L1 + 12 L2 GPS 2 SBAS (with DGPS option)	12 L1 2 SBAS (with DGPS option)
RTK	SmartCheck+	SmartCheck	No	No
Status indicators	3 LED indicators: for power, tracking, memory			

GPS1200 receivers	GX1230 GG/GX1230/GX1220	GX1210	ATX1230 GG/ATX1230
Ports	1 power port, 3 serial ports, 1 controller port, 1 antenna port		1 power/controller port, Bluetooth® port
Supply voltage,	Nominal 12 VDC		Nominal 12 VDC
Consumption	4.6 W receiver + controller + antenna		1.8 W
Event input and PPS	Optional:	Optional:	
	1 PPS output port	1 PPS output port	
	2 event input ports	2 event input ports	
Standard antenna	SmartTrack+ AX1202 GG	SmartTrack AX1201	SmartTrack+ ATX1230 GG
Built-in groundplane	Built-in groundplane	Built-in groundplane	Built-in groundplane

The following apply to all receivers except where stated.

Power supply	Two Li-Ion 3.8 Ah/7.2 V plug into receiver. One Li-Ion 1.9 Ah/7.2 V plugs into ATX1230 and RX1250.
Plug-in Li-Ion batteries Same for GPS and TPS	Power receiver + controller + SmartTrack antenna for about 15 hours (for data logging).
	Power receiver + controller + SmartTrack antenna + low power radio modem or phone for about 10 hours (for RTK/DGPS). Power SmartAntenna + RX1250 controller for about 5 hours (for RTK/DGPS)
External power	External power input 10.5 V to 28 V.
Weights	Receiver 1.20 kg. Controller 0.48 kg (RX1210) and 0.75 kg (RX1250). SmartTrack antenna 0.44 kg. SmartAntenna 1.12 kg. Plug-in Li-Ion battery 0.09 kg (1.9 Ah) and 0.19 kg (1.9 Ah).
	Carbon fiber pole with SmartTrack antenna and RX1210 controller: 1.80 kg.
	All on pole: carbon fiber pole with SmartAntenna, RX1250 controller and plug-in batteries: 2.84 kg.

Temperature ISO9022 MIL-STD-810F	Operation:	Receiver	−40° C to +65° C
	Antennas		−40° C to +70° C
	Controllers		−30° C to +65° C
	Storage:	Receiver	−40° C to +80° C
	Antennas		−55° C to +85° C
	Controllers		−40° C to +80° C
Humidity ISO9022, MIL-STD-810F	Receiver, antennas and controllers Up to 100 % humidity.		
Protection against water, dust and sand IP67, MIL-STD-810F	Receiver, antennas and controllers: Waterpoof to 1 m temporary submersion. Dust tight		
Shock/drop onto hard surface	Receiver: withstands 1 m drop onto hard surface. Antennas: withstand 1.5 m drop onto hard surface.		
Topple over on pole	Receiver, antennas and controllers: withstand fall if pole topples over.		
Vibrations ISO9022 MIL-STD-810F	Receiver, antennas and controllers: withstand vibrations on large construction machines. No loss of lock.		

SmartTrack+ **Advanced GNSS measurement technology**	Time needed to acquire all satellites after switching on: typically about 50 seconds. Re-acquisition of satellites after loss of lock (e.g. passing through tunnel): typically within 1 second.
	Very high sensitivity: acquires more than 99 % of all possible observations above 10 degrees elevation. Very low noise. Robust tracking. Tracks weak signals to low elevations and in adverse conditions. Multipath mitigation. Jamming resistant.
	Measurement precision: Carrier phase on L1: 0.2 mm rms. On L2: 0.2 mm rms. Code (pseudorange) on L1 and L2: 20 mm rms.
SmartCheck+ **Advanced, long range RTK technology**	Initialization typically 8 seconds. Position update rate selectable up to 20 Hz. Latency < 0.03 secs. Range 30 km or more in favorable conditions. Self checking.
	Accuracies: Horizontal: 10 mm + 1 ppm, kinematic Vertical: 20 mm + 1 ppm, kinematic Horizontal: 5 mm + 0.5 ppm, static Vertical: 10 mm + 0.5 ppm, static
	Reliability: 99.99 % for baselines up to 30 km.
	Formats supported for transmission and reception: Leica proprietary, CMR, CMR+, RTCM V2.1/2.2/2.3/3.0.
Reference station networks	RTK rover fully compatible with Leica's Spider i-MAX & MAX formats, VRS and Area Correction (FKP) reference station networks.
DGPS GX1230 (GG), ATX1230 (GG), GX1220 – standard GX1210 – optional	DGPS, includes support of WAAS and EGNOS. RTCM V2.1/2.2/2.3/3.0. formats supported for transmission and reception. Baseline rms: typically 25 cm rms with suitable reference station.
Position update rate and latency	Applies to RTK, DGPS and navigation positions. Update rate selectable from 0.05 sec (20 Hz) to 1 sec. Latency less than 0.03 secs.
NMEA output	NMEA 0183 V3.00 and Leica proprietary.
Post-processing with Leica Geo Office software **all GPS1200 dual-frequency receivers**	Horizontal: 10 mm + 1 ppm, kinematic Vertical: 20 mm + 1 ppm, kinematic Horizontal: 5 mm + 0.5 ppm, static Vertical: 10 mm + 0.5 ppm, static For long lines with long observations Horizontal: 3 mm + 0.5 ppm, static Vertical: 6 mm + 0.5 ppm, static
Notes on performance and on accuracies	Figures quoted are for normal to favorable conditions. Performance and accuracies can vary depending on number of satellites, satellite geometry, observation time, ephemeris, ionosphere, multipath etc.

Controllers RX1210/RX1250	High contrast, 1/4 VGA display. Touch screen, 11 lines x 32 characters. Windows CE 5.0 on RX1250. Full alphanumeric QWERTY keypad. Function keys and user definable keys. Illumination for screen and keys. Can also be used with TPS1200 for alphanumeric input and extensive coding.
Operation with controller Same for GPS and TPS	Via keypad and/or via touch screen. Graphical operating concept. Function keys and user definable keys. All information displayed.
Displayed information	All information displayed: status, tracking, data logging, database, RTK, DGPS, navigation, survey, stakeout, quality, timer, power, geographical, cartesian, grid coordinates etc.
Graphical display of survey Same for GPS and TPS	Graphical display (plan) of survey. Zooming. Can access surveyed points directly via touch screen.
Stakeout display Same for GPS and TPS	Graphical with zoom. Digital, polar and orthometric. Accuracy: 10 mm + 1 ppm at 20 Hz (0.05 sec) update rate. No degradation with high update rates.
Operation without controller GX1200 only	Automatic on switching on. LED status indicators. For reference stations and static measurements.
Data logging Same cards used for GPS and TPS	On CompactFlash cards: 64, 256 MB and 1 GB Optional internal receiver memory: 64 and 256 MB.
Capacity	64 MB sufficient for (20 % less for GPS/GLONASS): About 1 100 hours L1 + L2 data logging at 15 sec rate. About 4 400 hours L1 + L2 data logging at 60 sec rate. About 90 000 RTK points with codes.
Data management Same for GPS and TPS	User definable job management. Point identifiers, coordinates, codes, attributes etc.
	Search, filter and display routines. Multi point averaging. Five types of coding systems cover all requirements.
Coordinate systems Same for GPS and TPS	Ellipsoids, projections, geoidal models, coordinate, transformations, transformation parameters, country specific coordinate systems.
Application programs Same for GPS and TPS	Standard: Full range of COGO functions. Hidden point.
	Optional: RoadRunner, Reference Line, DTM Stakeout, Reference Plane, Area Division and X-Section Survey
Programmable Same for GPS and TPS	User programmable in GeoC++. Users can write and upload programs for their own special requirements and applications.
Communication **Data links**	One or two of the following devices can be connected: Radio modem, GSM, GPRS, CDMA.
	Different frequencies and/or formats can be received and transmitted. Time slicing is supported.

Leica System 1200 – working together

TPS, GPS and SmartStation.
Use TPS and GPS together or separately according to the work you do.
Use whichever is the most suitable for the job in hand.
Change easily from one to the other and use them in the same way.
Enjoy all the freedom, flexibility and power of System 1200.

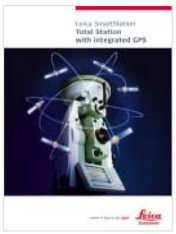
When it has to be right.

738812en – III.06 – RDV

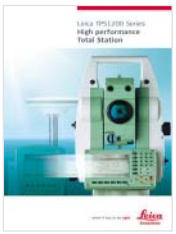
TQM
ISO 9001 / ISO 14001

Total Quality Management – our commitment to total customer satisfaction.

Ask your local Leica Geosystems dealer for more information about our TQM program.



Leica SmartStation
Product brochure



Leica TPS1200
Product brochure

Leica System1200 Software
Product brochure

Leica GRX1200
Product brochure

Leica Geosystems AG
Heerbrugg, Switzerland
www.leica-geosystems.com

- when it has to be **right**

Leica Geosystems