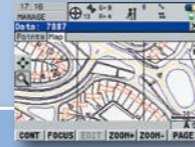


Leica SmartWorx Field Software



Standard features

Operation

Always in view status information bar
 Permanent display of current positioning accuracy
 Data import: ASCII, DXF, GSI, DTM models
 Data export: Custom ASCII, DXF, XML, Raw data
 Field-to-Office data transfer using ftp

Setup Reference

Configuration of RTK base station for operation without requiring a controller
 Selection of antenna type
 Selection of radio channel
 Computation of navigated base position

GPS Resection

Provides a rapid localisation of a GPS job
 Positions onto existing control points
 Uses a similar method as a TPS resection
 Requires no knowledge of coordinate systems

Determine Coordinate Systems

For the conversion of GNSS positions to local coordinates
 Provides a Onestep, Twostep or Classic 3D transformation type
 One point localisation for rapid calibration
 Display and recording of parameters and residuals
 Automatic matching of measured and entered points

Coordinate Geometry

Inverse, intersections, line and arc related computations
 Calculations made from entered or measured points
 Graphical plot view of computations
 Coding of calculated points
 Immediate stakeout of calculated points

Survey

Manual or automated point measurement
 Configurable display layout
 Point, line, area or free coding
 Smart and Quick coding
 Measuring of hidden points using offset data

Stakeout

Orientation to north, point, line, sun or by arrow
 Quality comparison between stake and design
 Automatic selection of closest design point
 Graphical selection of point from map display
 Design height editing during stakeout

Optional features

Reference Line

Staking of line, arcs and polylines
 Staking of chainages
 Staking of slopes
 Quality comparison between stake and design
 Graphical display of design

RoadRunner

Staking of alignments:
 Stringlines, single/double cross slopes, batters, surfaces
 Graphical staking and quality control
 Alignments can be created in the field
 Importing of alignments from various design formats
 Comprehensive field report of completed work

Volume Calculations

Computation of surface areas and volumes
 Using imported or measured points
 Graphical display of triangles
 DXF export of measured surfaces
 Comprehensive reporting

DTM Stakeout

Staking out of heights based on a digital terrain model
 Staking out of points with heights taken from the DTM
 Various DTM layers can be selected for stakeout
 Can be used for quality control of design surface

Functionality Options

GLONASS satellite tracking
 Raw data logging for post-processing
 RTK functionality with unlimited baseline length
 Position and display update rate of 5 Hz (0.2 sec)
 Reference network access (includes unlimited baseline)
 RTCM/CMR RTK data messages input
 Bluetooth® mobile phone connection



Leica GS09 GNSS Datasheet



GS09 SmartAntenna

The SmartAntenna can be used in a large variety of operating modes, providing you with a complete surveying system.

- RTK Rover – exceptionally rugged and light weight pole setup without any cables
- Reference Station – easily setup RTK base station operates without controller
- Network Rover – a complete surveying system, operating in all reference networks
- SmartStation – the GS09 fits onto a TPS creating one easy-to-use instrument



GS09 Controller

The Leica GS09 controller is designed to suit any surveying task with a wide range of functionality and application programs.

- Ergonomic – QWERTY alphanumeric keyboard and function keys for rapid data entry
- Colour Display – large display with touch screen functionality
- Removable Memory – up to 1 GB data storage on CompactFlash card



SmartWorx Field Software

SmartWorx is based on the proven and familiar operating concept of the Leica System 1200.

- Icon-based Menus – quick to learn, ensuring instant productivity
- Application Programs – enable any survey task to be easily and efficiently completed
- Field-to-Office – transfer data between the work site and the office computer
- Plug & Play – automatic detection of communication devices for easy setup



Total Quality Management – our commitment to total customer satisfaction.

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- when it has to be right



- when it has to be right



Leica GS09 Antenna



GNSS Technology 	Measurement Engine	
	Leica patented SmartTrack+ technology	<ul style="list-style-type: none"> Jamming resistant measurements High precision pulse aperture multipath correlator Excellent low elevation tracking technology Very low noise GNSS carrier phase measurements with <0.5 mm precision Minimum acquisition time
	No. of channels	120 channels
	Reacquisition time	< 1 sec
GNSS Measurements		
Satellite signals tracking	GPS: L1, L2, L2C (C/A, P, C Code) GLONASS: L1, L2 (C/A, P narrow Code)	
Measurement Performance 	Accuracy ¹	
	DGPS/RTCM	Typically 25 cm (rms)
	RTK Rapid static (phase) Static mode after initialization	Horizontal: 5 mm + 0.5 ppm (rms) Vertical: 10 mm + 0.5 ppm (rms)
	RTK Kinematic (phase) Moving mode after initialization	Horizontal: 10 mm + 1 ppm (rms) Vertical: 20 mm + 1 ppm (rms)
	Post Processing (phase) Static with long observations	Horizontal: 3 mm + 0.5 ppm (rms) Vertical: 6 mm + 0.5 ppm (rms)
	Post Processing (phase) Rapid static mode	Horizontal: 5 mm + 0.5 ppm (rms) Vertical: 10 mm + 0.5 ppm (rms)
	On-The-Fly initialization	
	Reliability	Better than 99,99% using Leica SmartCheck+ technology
	Time for initialization	Typically 8 sec ²
	RTK baseline range	up to 50 km
Hardware 	User Interface	
	Keys	On / Off key
	Led Status indicator	Satellite tracking, Bluetooth® communication and battery power
	Communication ports	<ul style="list-style-type: none"> Combined USB / Power port with 8-pin Lemo plug Integrated Bluetooth® port 5-pin clip on contacts for Leica SmartStation setup
	Physical	
	Weight	1.05 kg including battery
	Dimension (diameter x height)	186 mm x 89 mm
	Environmental specifications	
	Temperature, operating	-40° C to +65° C (-40° F to +149° F) ³
	Temperature, storage	-40° C to +80° C (-40° F to +176° F) ³
	Humidity	100% ⁴
	Sealed against water	IP67: Temporary submersion into water (max. depth 1 m)
	Sealed against sand and dust	Dust tight, protection against blowing dust
	Vibration	Withstands vibrations in compliance with ISO9022-36-08
	Drops	Withstands 1 m drop onto hard surface
Topple over	Withstands topple over from a 2 m survey pole onto hard surface	
Functional shock	No loss of lock to satellite signals when used on a pole setup and submitted to pole bumps up to 150 mm	
Power management		
Supply Voltage	Nominal 12 V DC, Range 10.5 – 28 V DC	
Power consumption	Typically: 1.8 W, 150 mA	
Internal Power supply	Removable & rechargeable Li-Ion battery, GEB211 2.2 Ah / 7.4 V or GEB212 2.6 Ah / 7.4 V	
Operation time	Up to 7 hours using GEB212 battery ⁵	
Communications 	RTK transmission	
	Source	Direct from GS09 (No datalogger required)
	RTK format	Leica Lite proprietary format
	Radio Modems	All Satellite and Pacific Crest radios in GFU or standard housing
	Integration with TPS	
	SmartStation functionality	Connects to Leica TPS1200, TS30 and TM30 instruments

Leica CS09 Controller



User Interface 	Standard software		
	Operating system	Microsoft Windows CE 5.0 software	
	Application software	Leica SmartWorx field software	
	Terminal software	Leica GX1200 sensor control	
Software control			
Display	¼ VGA colour, graphics capable		
Touch screen	Toughened film on glass		
Keyboard	62 keys with QWERTY alphanumeric & function keys		
Illumination	Backlight illuminated display and fully illuminated keys		
Hardware 	Physical		
	Dimension	218 mm x 123 mm x 47 mm	
	Weight of CS09	740 g including battery	
	Weight of pole setup	3.47 kg for complete rover pole setup	
	Weight of network rover	2.85 kg for complete network rover using a Bluetooth® mobile phone	
	Interfaces		
	Data storage	Removable CF card (256 MB and 1 GB available)	
	Communication ports	<ul style="list-style-type: none"> Combined USB/Power port with 8-pin Lemo plug 2 x Bluetooth® ports Class 2 7-pin clip on contacts for GHT56 SmartHolder connection 	
	Environmental Specifications		
	Temperature, operating	-30° C to +65° C (-22° F to +149° F) ³	
Temperature, storage	-40° C to +80° C (-40° F to +176° F) ³		
Humidity	100% ⁴		
Sealed against water	IP67: Temporary submersion into water (max. depth 1 m)		
Sealed against sand and dust	Dust tight, protection against blowing dust		
Drops	Withstands 1.5 m drop onto hard surface		
Vibration	Withstands vibrations in compliance with ISO9022-36-08		
Power Management			
Supply Voltage	Nominal 12 V DC, Range 11.5 – 28 V DC		
Power consumption	Typically: 1.4 W, 120 mA		
Internal Power supply	Removable & rechargeable Li-Ion battery, GEB211 2.2 Ah / 7.4 V or GEB212 2.6 Ah / 7.4 V		
Operation time:	Up to 13 hours using GEB212 battery ⁵		
Communications 	RTK specifications		
	Data Formats	Leica propriety formats (Leica, Leica Lite, Leica 4G) Optional CMR, CMR+, RTCM 2.1, RTCM 2.3, RTCM 3.0, RTCM 3.1	
	RTK baseline	Optional 5 km maximum baseline or unlimited baseline lengths	
	Position update rate	1 Hz standard. Optional 20 Hz (0.05 sec)	
	Network Rover	VRS, FKP, iMAX, MAX, Nearest station	
	External Devices		
	Radio Modem	Satellite and Pacific Crest radios in GFU housing (connected using GHT56 SmartHolder)	
	Mobile Phone	<ul style="list-style-type: none"> GSM / CDMA modules in GFU housing (connected using GHT56 SmartHolder) Bluetooth® mobile phones 	
	GS09 antenna	<ul style="list-style-type: none"> Bluetooth® USB Cable 	
	PC with Microsoft Windows	<ul style="list-style-type: none"> USB data cable CF-card reader 	
Internet	Mobile phone using FTP protocol		

¹ 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 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.

² May vary due to atmospheric conditions, multipath, obstructions, signal geometry and number of tracked signals.

³ Compliance with ISO9022-10-08, ISO9022-11-special and MIL-STD-810F Method 502.4-II, MIL-STD-810F Method 501.4-II

⁴ Compliance with ISO9022-13-06, ISO9022-12-04 and MIL-STD-810F Method 507.4-I

⁵ May vary with temperature and battery age.