

Παράρτημα Β



Τεχνικά χαρακτηριστικά

SPECIFICATIONS

HIPER PRO	
DESCRIPTION	40 channel integrated GPS ⁺ receiver/antenna with MINTER interface
TRACKING SPECIFICATIONS	
Tracking channels, standard	40 L1 GPS (20GPS L1+L2 on Cinderella days) *
Tracking channels, optional	20 GPS L1+L2 (GD), GPS L1 + GLONASS (GG) 20 GPS L1+L2+GLONASS (GGD)
Signals Tracked	GPS L1/L2, C/A and P Code & Carrier and GLONASS L1/L2 and L2C
PERFORMANCE SPECIFICATIONS	
Static, Rapid Static	H: 3 mm + 0.5 ppm V: 5 mm + 0.5 ppm
RTK	H: 10 mm + 1.0 ppm V: 15 mm + 1.0 ppm
Cold Start	<60 seconds
Warm Start	<10 seconds
Reacquisition	<1 second
POWER SPECIFICATIONS	
Battery	Internal Lithium-Ion batteries for up to 14+ hours of operation (10 hours Tx)
External power input	6 to 28 volts DC
Power consumption	Less than 4.2 watts
GPS⁺ ANTENNA SPECIFICATIONS	
GPS / GLONASS Antenna	Integrated
Ground Plane	Integrated flat ground plane
RADIO SPECIFICATIONS	
Radio Type	Internal Tx/Rx (selectable frequency range)
Power Output	1.0 Watt / 0.25 Watt (selectable)
Radio Antenna	Center-mount UHF Antenna
WIRELESS COMMUNICATION	
Communication	Bluetooth® version 1.1 comp. **†
I/O	
Communication Ports	2x serial (RS232)
Other I/O Signals	1pps, Event Marker
Status Indicator	4x3-color LEDs (Green, Red, Yellow), two-function keys (MINTER)
Control & Display Unit	External Field Controller
MEMORY & RECORDING	
Internal Memory	Up to 1 GB
Update Rate	Up to 20 times per second (20Hz)
Data Type	Code and Carrier from L1 and L2, GPS and GLONASS and L2C GLONASS
DATA OUTPUT	
Real time data outputs	RTCM SC104 version 2.1, 2.2, 2.3, CMR, CMR+
ASCII Output	NMEA 0183 version 3.0
Other Outputs	TPS format
Output Rate	Up to 20 times per second (20Hz)
ENVIRONMENTAL SPECIFICATIONS	
Enclosure	Aluminum extrusion, waterproof
Operating	Temperature -30°C to 55°C
Dimensions	W:159 x H:172 x D:88 mm
Weight	1.65 kg

Specifications are subject to change without notice. Performance specifications assume a minimum of 6 GPS or 7 GPS/GLONASS satellites above 15 degrees in elevation and adherence to procedures recommended by TPS in the appropriate manuals. In areas of high multipath, during periods of high PDOP and during periods of high ionospheric activity performance may be degraded. Robust checking procedures are highly recommended in areas of extreme multipath or under dense foliage.

* Cinderella feature activates full receiver reception at GPS midnight every other Tuesday for 24 hours.

** Bluetooth® type approvals are country specific. Please contact your Topcon representative for more information.

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DGPS, Navigation, ControlStation Software

DGPS to 0.3m RTCM input/output

With the RTCM input/output option and a radio modem, the SR520 can be used as a DGPS reference station for the transmission of RTCM corrections and as a DGPS rover. Accuracies as high as 0.3m rms are attainable. The SR520 also outputs NMEA sentences for input into navigation and hydrographic software.

Navigation

The SR520 with the TR500 terminal displays full navigation information: position, course, speed, bearing and distance to waypoints. If you need more, we have the revolutionary MX480 the world's most accurate professional chart navigation system.

ControlStation Reference-station software

The SR520 with a PC and ControlStation software form a highly efficient reference station for single and dual-frequency receivers operating in the area.

RTCM corrections can be transmitted. Features include receiver control, continuous or selected data logging and more.

Technical specifications LEICA SR520 Dual-frequency geodetic receiver

Modes and applications	Static, rapid static, kinematic, On The Fly. With post processing with SKI-Pro Software. DGPS/RTCM optional
12 L1 channels	Full phase, C/A narrow code, precision code
12 L2 channels	Full phase, P code, P-code-aided under AS
Power and weight	12 VDC nominal, 5.5W SR520+terminal, Wt. 1.15kg
AT502 antenna	L1/L2 microstrip, built-in groundplane, 0.4kg
Baseline rms with post processing with SKI-Pro software	Static, long lines, long observations: 3mm + 0.5ppm (rms) Rapid static: 5mm + 1ppm (rms) Kinematic/moving after initialization: 10mm + 1ppm (rms) Code only: typically 30cm (rms)
DGPS/RTCM - optional	DGPS/RTCM optional, accuracy typically 30cm (rms)
Note on baseline rms	Baseline rms = accuracy in position Accuracy in height = 2 x accuracy in position
Figures are for normal to favorable conditions	Figures also depend on number of satellites, geometry, observation time, ephemeris, ionosphere, multipath etc.
TR500 terminal	Display: 12 lines of 32 characters. Weight 0.4kg
Data recording, selectable 0.1 to 60 secs. rec. rate	PCMCIA ATA flash cards: 8MB, 16MB, 85MB Optional internal memory: 8MB, 16MB
Hours of recording with 16MB capacity	About 625 hours at 15 sec rate, 2500 hours at 60 sec (Divide by 2 for 8MB. Multiply by 5 for 85MB)
GEB121 battery, 2 batteries plug into SR520	3.6Ah/8V, 2 GEB121 power SR520 + terminal for about 7.5 hours. GEB121: weight, 0.35kg
External power supply	GEB71 7Ah/12V external battery or any 12V source
Operation without terminal	Automatic on switching ON, 3 LED status displays
Operation with terminal	Menu driven, two-level operating system
Operating modes	Data recording, survey, timer, positioning/navigation DGPS/RTCM is optional
Coordinate displays	Geographical: Lat, Long, Ht Cartesian: X, Y, Z Grid: E, N, Ht with transformation parameters
Positioning with navigation or optional DGPS/RTCM	Graphical with zoom, Digital, Polar and orthometric. DGPS/RTCM optional, accuracy typically 30cm (rms)
Position update rate	10Hz (0.1 sec)
On board programs for use with optional DGPS/RTCM	Coordinate geometry, Areas, Lines/grids, Hidden point. DGPS/RTCM optional, accuracy typically 30cm (rms)
Coordinate systems	Ellipsoids, projections, transformation, geoidal models
Environmental:	Operation Storage
Receiver, terminal etc	- 20 deg. C to +55 deg. C -40 deg. C to +70 deg. C
Antenna	- 40 deg. C to +75 deg. C -40 deg. C to +75 deg. C
SKI-Pro software	Professional Office Support Software
Not protected, run without software-protection key	Planning, management, transfer, ASCII import/export, view/edit, coding, reporting, help
Protected options, need software-protection key	Data processing, datum/map/transformation, design/adjustment, GIS/CAD export, RINEX import



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about our TQM program.



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Leica TPS1200+

Technical specifications and system features



Models and options

	TC	TCR	TCRM	TCA	TCP	TCRA	TCRP
Angle measurement	*	*	*	*	*	*	*
Distance measurement (IR-Mode)	*	*	*	*	*	*	*
PinPoint reflectorless dist. measur. (RL-Mode)		*	*			*	*
Motorized			*	*	*	*	*
Automatic Target Recognition (ATR)			*	*	*	*	*
PowerSearch (PS)					*		*
Guide Light (EGL)	o	o	o	*	*	*	*
Remote Control Unit / RadioHandle	o	o	o	o	o	o	o
GUS74 Laser Guide				o		o	
SmartStation (ATXL230+ GNSS)	o	o	o	o	o	o	o

* = Standard o = Optional

Angle measurement

	Type 1201+	Type 1202+	Type 1203+	Type 1205+	
Accuracy (std.dev., ISO 17123-3)	Hz, V	1" (0.3 mgon)	2" (0.6 mgon)	3" (1 mgon)	5" (1.5 mgon)
	Display resolution:	0.1" (0.1 mgon)	0.1" (0.1 mgon)	0.1" (0.1 mgon)	0.1" (0.1 mgon)
Method	absolute, continuous, diametrical				
Compensator	Working range:	4' (0.07 gon)	4' (0.07 gon)	4' (0.07 gon)	4' (0.07 gon)
	Setting accuracy:	0.5" (0.2 mgon)	0.5" (0.2 mgon)	1.0" (0.3 mgon)	1.5" (0.5 mgon)
	Method:	centralized dual axis compensator			

Distance measurement (IR-Mode)

Range (average atmospheric conditions)	Round prism (GPR1):	3000 m
	360° reflector (GR24):	1500 m
	Mini prism (QWP101):	1200 m
	Reflective tape (60 mm x 60mm)	250 m
	Shortest measurable distance:	1.5 m
Accuracy / Measurement time (standard deviation, ISO 17123-4)	Standard mode:	1 mm + 1.5 ppm / typ. 2.4 s
	Fast mode:	3 mm + 1.5 ppm / typ. 0.8 s
	Tracking mode:	3 mm + 1.5 ppm / typ. < 0.15 s
	Display resolution:	0.1 mm
Method	Special phase shift analyzer (coaxial, visible red laser)	


PinPoint R400/R1000 reflectorless distance measurement (RL-Mode)


Range (average atmospheric conditions)	PinPoint R400:	400 m / 200 m (Kodak Gray Card: 90% reflective / 18% reflective)
	PinPoint R1000:	1000 m / 500 m (Kodak Gray Card: 90% reflective / 18% reflective)
	Shortest measurable distance:	1.5 m
Accuracy / Measurement time (standard deviation, ISO 17123-4) (object in shade, sky overcast)	Long Range to round prism (GPR1):	1000 m ~ 7500 m
	Reflectorless < 500 m:	2 mm + 2 ppm / typ. 3 - 6 s, max. 12 s
	Reflectorless > 500 m:	4 mm + 2 ppm / typ. 3 - 6 s, max. 12 s
	Long Range:	5 mm + 2 ppm / typ. 2.5 s, max. 12 s
Laser dot size	At 30 m:	approx. 7 mm x 10 mm
	At 50 m:	approx. 8 mm x 20 mm
Method	PinPoint R400 / R1000: System analyzer (coaxial, visible red laser)	

Motorized

Maximum speed	Rotating speed:	45° / s
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Automatic Target Recognition (ATR)		
 Range ATR mode / LOCK mode (average atmospheric conditions)	Round prism (GPR1):	1000 m / 800 m
	360° reflector (GR24, GRZ122):	600 m / 500 m
	Mini prism (GWP101):	500 m / 400 m
	Reflective tape (60 mm x 60 mm):	55 m (175 ft)
	Shortest measurable distance:	1.5 m / 5 m
Accuracy / Measure time (std. dev. ISO 17123-3)	ATR angle accuracy Hz, V:	1" (0.3 mgon)
	Base positioning accuracy:	± 3mm
	Measure time for GPR1:	3 - 4 s
Maximum speed (LOCK mode)	Tangential (standard mode):	5 m / s at 20 m, 25 m / s at 100 m
	Radial (tracking mode):	4 m / s
Method	Digital image processing (laser beam)	

PowerSearch (PS)		
 Range (average atmospheric conditions)	Round prism (GPR1):	300 m
	360° reflector (GR24, GRZ122):	300 m (perfectly aligned to instrument)
	Mini prism (GWP101):	100 m
	Shortest distance:	5 m
Search time	Typical search time:	< 10 s
Maximum speed	Rotating speed:	45° / s
Method	Digital signal processing (rotating laser fan)	

Guide Light (EGL)		
 Range (average atmospheric conditions)	Working range:	5 m - 150 m
	Accuracy	Positioning accuracy:

General data		
	Telescope	
	Magnification:	30 x
	Free objective aperture:	40 mm
	Field of view:	1°30' (1.66 gon) / 2.7 m at 100 m
	Focusing range:	1.7 m to infinity
	Keyboard and Display	
	Display:	1/4 VGA (320*240 pixels), graphic LCD, colour, illumination, touch screen
	Keyboard:	34 keys (12 function keys, 12 alphanumeric keys), illumination
	Angle display:	360° °', 360° decimal, 400 gon, 6400 mil, V%
	Distance display:	meter, int. ft, int. ft/inch, US ft, US ft/inch
	Position:	face I standard / face II optional
	Data storage	
Internal memory:	256 MB (optional)	
Memory card:	CompactFlash cards (256 MB)	
Number of data records:	1750 / MB	
Interfaces:	RS232, Bluetooth® Wireless-Technology (optional)	
Circular Level		
Sensitivity:	8' / 2 mm	
Laser plummet		
Centering accuracy:	1.5 mm at 1.5 m	
Laser dot diameter:	2.5 mm at 1.5 m	
Endless drives		
Number of drives:	1 horizontal / 1 vertical	
Battery (GEB221)		
Type:	Lithium-Ion	
Voltage:	7.4 V	
Capacity:	4.4 Ah	
Operating time:	typ. 5 - 8 h	
Weights		
Total station:	4.8 - 5.5 kg	
Battery (GEB221):	0.2 kg	
Tribrach (CDF121):	0.8 kg	
Environmental specifications		
Working temperature range:	-20°C to +50°C	
Storage temperature range:	-40°C to +70°C	
Dust / water (IEC 60529):	IP54	
Humidity:	95% non-condensing	

Remote Control Unit (RX1250T/Tc)		
	Communication	via integrated radio modem
	Control unit	Display:
Keyboard:		62 keys (12 function keys, 40 alphanumeric keys), illumination
Interface:		RS232
Battery (GEB211)	Type:	Lithium-Ion
	Voltage:	7.4 V
	Capacity:	2.2 Ah
	Operating time:	RX1250T: typ. 9 h, RX1250Tc: typ. 8 h
Weights	Control unit RX1250T/Tc:	0.8 kg
	Battery (GEB211):	0.1 kg
	Reflector pole adapter:	0.25 kg
Environmental specifications	Working temperature range:	RX1250T -30°C to +65°C / RX1250Tc -30°C to +50°C
	Storage temperature range:	-40°C to +80°C
	Protection against water, dust and sand (IEC 60529, MIL-STD-810F)	IP67
		waterproof to 1 m temporary submersion, dust tight

ZDL700 Series

Accessories and Technical Data

Fibreglass high accuracy staff

For high precision measurement campaigns we offer a one section 3 m fibreglass staff; 0.7 mm standard deviation for 1 km double-run levelling, front: code, reverse: graduated (766162).

Telescopic standard staff

For all your standard levelling activities we offer the flexible

4 sectional 5 m aluminium staff; 2.0 mm standard deviation for 1 km double-run levelling, front: code, reverse: graduated (766163).



Light weight precision tripod

Accurate work demands quality accessories, we recommend the fully tested light weight original tripods from our GeoMax accessories selection to reach highest accuracy for all your tasks (765603, 765604).

Accuracy

Height accuracy $\pm 0.7 \text{ mm/km}$
 Distance accuracy $D < 10 \text{ m}, 10 \text{ mm} \mid D \geq 10 \text{ m}, 0.001 \times D$

Systems

Maximum Range 105 m
 Minimum Range 2 m
 Single measurement speed $< 3 \text{ sec.}$
 Minimum lighting condition 20 Lux
 Minimum field of view $\geq 50 \%$

Display

Minimum resolution (Ht) 0.1 mm
 Minimum resolution (Dist) 1 mm

Telescope

Magnification 24 x

Compensator

Range $\pm 10'$
 Setting accuracy $\pm 0.35''$

Communication

Internal memory 2'000 measurements
 Interface RS232

Environmental conditions

Operating / Storage Temperature $-10^\circ \text{C} \sim +50^\circ \text{C} / -40^\circ \text{C} \sim +70^\circ \text{C}$
 Protection to dust and water IP55

Weight

Weight including battery $< 2.5 \text{ kg}$

Battery

AA dry cells (4XLR6 / AA 1.5V)
 1800mAh / 2300mAh 14 /16 hours continuous measurement



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Technical Specifications DL-101/102C

SPECIFICATIONS	DL-101C	DL-102C
Telescope		
Magnification	32x	30x
Objective Aperture	45mm	
Field of view	1°20'	
Resolving power	3"	
Compensator		
Working Range	±12'	±15'
Setting Accuracy	0.3"	0.5"
Height measurement		
Accuracy (Standard deviation for 1km double-run levelling)		
Electronic reading	0.4mm w/Invar staff	1.0mm w/Fiberglass staff
Optical reading	1.0mm	1.5mm
Least Count	0.1mm/0.01mm	1mm/0.1mm
Distance measurement		
Least Count	1cm/1mm	1cm
Accuracy	1cm to 5cm	
Measuring range	2m to 100m : Fiberglass staff/Aluminium staff 2m to 60m : Invar staff	
Measuring time	4 sec.	
Circular level sensitivity	8'/2mm	10'/2mm
Others		
Display	2-line, 8-digit per line. Dot matrix LCD with backlight	
Data Storage	PCMCIA card (up to 2 MB) Internal memory approx. 8,000 data lines (400KB)	
Data transmission	RS-232C port provided	
Keyboard	Alphanumeric input	
Horizontal Circle	360° or 400gon	

Power Supply	On-board rechargeable battery, NiCd 7.2V
Operating Time	10 hours
Ambient Temperature Range	-20°C to +50°C [-4°F to +122°F]
Dimensions	237 x 196 x 141mm [9.33 x 7.72 x 5.55 inch]
Weight	2.8 kg [6.16 lbs.] (including on-board battery)
Staves	
Aluminium staff (various)	Length: 5m, 4m or 3m (telescopic) 4m or 3m (folding)
Fiberglass staff SG-3M	Length: 3m (2 sections)
Invar staff	Length: 3m, 2m or 1m

Technical Specifications LEICA SPRINTER 150M

13. Technical Data

Height measurements	Standard deviation per km double run (ISO 17123-2): <ul style="list-style-type: none"> • Electronic measurement with Sprinter aluminum barcode staff: <ul style="list-style-type: none"> • 1.0 mm (Sprinter 250M) • 1.5 mm (Sprinter 150/150M) • Optical measurement with standard aluminum E-scale/Numeral staff: 2.5 mm • Standard Deviation for single staff reading: 0.6 mm (electronic) and 1.2 mm (optical) at 30m
Distance Accuracy (Standard Deviation)	10 mm for D<= 10 m Distance in m x 0.001 for D>10 m
Range	Distance measuring range for electronic measurements with standard aluminum barcode staff: 2 m to 100 m.
Optical - Shortest focusing distance	50 cm
Measuring time single measure (Electronic)	Typically 3 seconds and less in normal daylight condition; needs longer measuring time in uniform dim light condition (20 lux).
Circular Bubble	Circular Bubble Sensitivity: 10/2 mm
Compensator	Magnet damped pendulum compensator with electronic range monitoring <ul style="list-style-type: none"> • Tilt Warning Range (Electronically): $\pm 10'$ • Compensator range (Mechanically): $\pm 10'$ • Setting accuracy: 0.8" max. (Standard Deviation) • Magnetic field sensitivity: < 10" (Line-of-sight difference in horizontal constant magnetic field at a field strength of up 5 Gauss)
RS232 Port*	For RS232 cable connection to external battery and communication to PC / data collector.
Phone Jab Port*	For USB cable connection to communication to PC.
Internal Memory Storage*	Capacity: up to 1000 points.
Data Transfer*	Program: To DataLoader via USB, to Leica Geo Office and HyperTerminal via RS232 on PC, using a Windows® application
Power Supply	<ul style="list-style-type: none"> • Sprinter 150: internal battery • Sprinter 150M/250M: internal battery and external via RS232 port.
Battery Power	Battery internal: AA dry cells 4 x 1.5 V; powered via RS232 port: Nominal voltage 12 V  voltage range 4 - xx V  GEV71 power cable to a 12 V car battery; current rating max. 300 mA.
LCD	<ul style="list-style-type: none"> • Type: Monochrome display with backlight capability • Dimensions: 128 x 104 pixels
Telescope	<ul style="list-style-type: none"> • Magnification (Optical): 24 x • Free objective diameter: 36 mm • Clear Objective Aperture: 2 ° • Multiplication constant: 100 • Addition constant: 0
Hz Circle	Circle Engraving: Plastic horizontal circle of 360° (400 gon). Graduation and numerals scale resolution at 1°(upper scale) and at 50 gon intervals (lower scale)
Side Drive	Movement & Play in side drive: Continuous horizontal dual drive
System	<ul style="list-style-type: none"> • MMI capability • Measuring / applications • Keyboard: 5 rubber keys
Temperature Range	<ul style="list-style-type: none"> • Operating Temperature: -10°C to +50°C • Storage Temperature: -40°C to +70°C

Environmental Specifications	<ul style="list-style-type: none"> • Protection against water, dust and sand: IP55 (IEC 60529) • Protection against Humidity: Up to 95% humidity no condensation. The effects of condensation are to be effectively counteracted by periodically drying out the product.
Dimensions	<p>Instrument:</p> <ul style="list-style-type: none"> • Length (incl. front of lens tube to fully extended eyepiece) 219 mm • Width (from the external face of focusing drive to the external side of circular bubble holder) 196 mm • Height (incl. hand grip, base fully extended) 178 mm <p>Container:</p> <ul style="list-style-type: none"> • Length 400 mm • Width 220 mm • Height 325 mm
Weight	2.55 kg (including 4 AA batteries)