February 2006

Trimble SPS750 Modular GPS Receiver

Flexible modular receiver for permanent base station, supervisor's systems and rover operations

General Description

The Trimble® SPS750 Modular GPS Receiver sets new standards for rapid setup and flexible operation in both base station and rover applications.

Modularity provides the ability to choose the appropriate Global Positioning System (GPS) antenna for the application, Zephyr Geodetic Model 2 at the base station and the Zephyr Model 2 for the mobile units. The GPS and Radio antennas can be mounted high in permanent and semi-permanent base station applications so that they are clear from obstructions and provide maximum radio coverage, while the receiver and radio are locked in a secure environment safe from theft and the weather. The choice of radio antennas allows them to be either attached to the receiver itself for mobile base station and rover applications, or equipped with high gain or directional antenna for maximum range on large job sites.

Standard System Features

- Integrated GPS receiver and radio
- 450 or 900 MHz with Transmit/Receive capability (Max); 450 or 900 MHz radio option with Transmit or Receive (Basic) capability
- 24-channel L1/L2 GPS receiver
- OmniSTAR XP and HP service capable
- WAAS, EGNOS & MSAS Satellite Based Augmentation Systems (SBAS) compatible
- Tough housing
- IP67 environmental rating

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- -40 °C to +65 °C (-40 °F to +149 °F) operating temperature range
- 9V to 30V DC input power range with over-voltage protection
- Long life integrated battery provides >12 hours operation as a base station with internal Transmit/Receive radio, and >16 hours as a rover.
- Integrated display and keypad for system configuration without a controller
- Integrated Bluetooth® for cable-free configuration and operation with a controller
- Choice of external GPS antenna for base station or rover operation
- Rubber duck antenna for rover operations, or external radio antenna for a high gain solution in base station operations
- Small, lightweight design – 1.65 kg (3.64 lbs) (receiver only with battery) 4 kg (8.82 lbs) complete system weight (Rover including controller and rod)
- Permanent or semi-permanent base station, or mobile base station versatility
- ATV, belt, rod, supervisor's vehicle or marine vessel mounting options for rover applications
- Capable of all site measurement and stakeout operations within 1.5 miles (2.4km) (Basic), >3.0 miles (5km) (Max)
- Easy to use menu system for rapid configuration and status checking
- Autobase for rapid and automated repeated daily base station setups
- Supports IP so it can be configured and checked remotely over the Internet via an Ethernet port
- One base station receiver can broadcast corrections via multiple radio links. For example, broadcast corrections via an internal 450 MHz radio, as well as an external 900 MHz radio from the same base station receiver (Max)

SPS750 Basic Receiver Features

- Base station only or Rover only operation

Base Station

- Entry-level, low-cost base station
- Provides unrestricted operational range for rovers and grade control systems
- Integrated transmit only radio

Rover

- Entry-level, low-cost rover receiver
- 2 Hz measurement update rate
- 1.5 mile (2.4 km) operational range from the base station

- Integrated receive-only radio
- Ideal for contractors new to GPS as a starter system or operating multiple small projects

  Upgradeable to Max capability

SPS750 Max Receiver Features

- Base station and rover operation in a single receiver
- Integrated receive/transmit radio
- 5/10 Hz measurement update rate
- Unrestricted rover operational range
- Operates within a VRS network for base station-free rover capability
- Rover operates with OmniSTAR HP or XP services for base station free rover capability with <30cm (1 foot) accuracy
- Supports moving base

Specifications

General Characteristics	Specifications
Keyboard and display	VFD display 16 characters by 2 rows On / Off key for one button start up with Autobase Escape and Enter key for menu navigation 4 arrow keys (up, down, left, right) for option scrolls and data entry
Receiver type	Modular GPS receiver
Antenna type Base Station Rover OmniSTAR Rover	 Zephyr Geodetic Model 2 Zephyr Model 2 Z+ Antenna Also supports legacy antennas Zephyr, Zephyr Geodetic, Micro-centered, Choke ring, Rugged micro-centered for GPS L1/L2 operation only.

Physical characteristics	Specifications
Dimensions (L x W x H)	24cm (9.4 in) x 12cm (4.7 in) x 5cm (1.9 in) including connectors
Weight	1.65 kg (3.64 lbs) receiver with internal battery and radio 1.55 kg (3.42 lbs) receiver with internal battery and no radio
Temperature[4] Operating Storage	 -40 °C to +65 °C (-40 °F to +149 °F) -40 °C to +80 °C (-40 °F to +176 °F)
Humidity	100%, condensing
Waterproof	IP67 for submersion to depth of 1 m (3.28 ft)
Shock and vibration Shock - non operating Shock – operating Vibration	Tested and meets the following environmental standards: Designed to survive a 2m (6.6 ft) pole drop onto concrete MIL-STD-810F, Fig.514.5C-17 To 40 G, 10 msec, saw-tooth MIL-STD-810F, FIG.514.5C-17
Measurements	Advanced Trimble Maxwell 5 Custom GPS chip High-precision multiple correlator for L1 and L2 pseudo-range measurements Unfiltered, unsmoothed pseudo-range measurements data for low noise, low multi-path error, low time domain correlation and high dynamic response Very low noise L1 and L2 carrier phase measurements with <1mm precision in a 1 Hz bandwidth L1 and L2 Signal-to-Noise ratios reported in dB-Hz Proven Trimble low elevation tracking technology 24 Channels L1 C/A Code L1/L2 Full Cycle Carrier WAAS / EGNOS / MSAS
Code differential GPS positioning[1] Horizontal accuracy Vertical accuracy WAAS / EGNOS / MSAS Horizontal accuracy Vertical accuracy	 ±(0.25 m + 1 ppm) RMS, ± (9.84 in + 1 ppm) RMS ±(0.50 m + 1 ppm) RMS, ± (19.68 in + 1 ppm) RMS Typically <1 m (3.28 ft) Typically <5 m (16.40 ft)
OmniSTAR Positioning XP Service Accuracy HP Service Accuracy	 Horizontal 20 cm (7.87 in), Vertical 30 cm (11.80 in) Horizontal 10 cm (3.93 in), Vertical 15 cm (5.90 in)
Real Time Kinematic (RTK) positioning[1] Horizontal Vertical Initialization time Regular RTK operation with base station	 ±(10 mm + 1 ppm) RMS, ± (0.38 in +1 ppm) RMS ±(20 mm + 1 ppm) RMS, ± (0.78 in +1 ppm) RMS Single/Multi-base minimum 10 sec + 0.5 times baseline length in km, <30 km

Physical characteristics	Specifications
RTK operation with Scalable GPS infrastructure	<30 seconds typical anywhere within coverage area (Max option only)
Initialization reliability[3]	Typically >99.9%

Electrical characteristics	Specifications
Power	
Internal	Integrated internal battery 7.4V, 7800 mA-hr, Li-Ion Internal battery operates as a UPS in the event of external power source outage Internal battery will charge from external power source when input voltage is >15V Integrated charging circuitry
External	Power input on 7 pin 0 shell Lemo is optimized for lead acid batteries with a cut off threshold of 10.5V Power input on the 26 pin DSub connector is optimized for Trimble Li-Ion battery input (PN 49400) with a cut off threshold of 9V Power source (Internal / External) is hot swap capable in the event of power source removal or cut off. 9V to 30V DC external power input with over-voltage protection Receiver will Auto Power On when connected to external power
Power consumption	6.3w, in RTK rover mode with internal receive radio 8.5w, in RTK Base mode with internal transmit radio
Rover operation times on internal battery	
450 MHz 2.0W systems	16 hrs; varies with temperature
900 MHz 1.0W systems	16 hrs; varies with temperature
Base station operation times on internal battery	
External radio	16 hrs; varies with temperature
450 MHz 0.5W systems*	12 hrs; varies with temperature
900 MHz 1.0W systems	12 hrs; varies with temperature
*Users who purchase the 2.0w upgrade will experience battery degradation compared to the results listed here for a .5w solution.	
Certification	Class B Part 15, 22, 24 FCC certification Canadian FCC CE mark approval C-tick approval UN ST/SG/AC.10.11/Rev. 3, Amend. 1 (Li-Ion Battery) UN ST/SG/AC. 10/27/Add. 2 (Li-Ion Battery) UN T1 – T8 (Li-Ion Battery)

Electrical characteristics	Specifications
	49 CFR Sections 100-185 (Li-Ion Battery) WEEE

Communications Characteristics	Specifications
Communications	
Port 1 (7-pin 0S Lemo)	3-wire RS-232 CAN
Port 2 (DSub 26-pin)	Full RS-232 (Via multi-port adapter) 3 –wire RS-232 USB (On the Go) (Via multi-port adapter)
Bluetooth	Ethernet (Via multi-port adapter) (Max only) Fully integrated, fully sealed 2.4 GHz Bluetooth[5]
Integrated Radios	Fully integrated, fully sealed internal 450 MHz, TX, RX or TXRX[6] Fully integrated, fully sealed internal 900 MHz, TX, RX or TXRX[6]
Channel spacing (450MHz)	12.5 or 25KHz spacing available Dealer configurable, TX, TX/RX End User Configurable Rx Only
Frequency approvals (900MHz)	USA (-10), Australia (-20), New Zealand (-30)
450MHz Transmitter radio power output	0.5w / 2.0w (2.0w upgrade only available in select countries)
900MHz Transmitter radio power output	1.0w (30 dBm)
Receiver position update rate	
SPS750 Basic	1 and 2 Hz positioning
SPS750 Max	1, 2, 5 and 10 Hz positioning
Data Input and Output	CMR+, RTCM 2.1, RTCM 2.3, RTCM 3.0
Outputs	NMEA, GSOF and RT17 (RT17 Max)
Carrier	Supports BINEX and smoothed carrier (Max)

Receiver Options	Specifications
Internal Data Logging Option	Provides approx 2 MB of internal memory for static data measurements

450 MHz integrated radio capabilities	Base Station Receiver	Rover Receiver
SPS750 Basic	Transmit only	Receive only
SPS750 Max	Transmit / Receive	Transmit / Receive

900 MHz integrated radio capabilities	Base Station Receiver	Rover Receiver
SPS750 Basic	Transmit only	Receive only
SPS750 Max	Transmit / Receive	Transmit / Receive

Base/Rover operations capability

Receiver	Specifications
SPS750 Basic	Base only or Rover only
SPS750 Max	Base and Rover

Measured vector baseline length (Rover operational range from base station)

Receiver	Specifications
SPS750 Basic	1.5 miles (2.4 km)
SPS750 Max	Unrestricted (limited to radio or cellular coverage only). Typically 1.8 – 3 miles (3-5 km) without repeater radio.

Rover operation within a VRS network using cellular phone dial up

Receiver	Specifications
SPS750 Basic	Disabled
SPS750 Max	Enabled

1. Accuracy and reliability may be subject to anomalies such as multipath, obstructions, satellite geometry and atmospheric conditions. Always follow recommended practices
2. Depends on WAAS / EGNOS / MSAS system performance
3. May be affected by atmospheric conditions, signal multipath and satellite geometry. Initialization reliability is continuously monitored to ensure highest quality
4. Receiver will operate normally to -40°C. Bluetooth module and internal batteries are rated to -20°C
5. Bluetooth type approvals are country-specific. Contact your local Trimble office or representative for more information
6. RX or TX only option only on Basic, TXRX option on Max receiver

Specifications are subject to change without notice.