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Trimble SPS780 Smart GPS Antenna

Highly portable, flexible GPS receiver

General Description

The Trimble® SPS780 Smart GPS Antenna is the simple solution to all your site measurement and stakeout applications. The rugged smart antenna includes an integrated radio, GPS receiver, GPS antenna and battery in a single, lightweight housing designed for maximum portability, quick setup and optimal flexibility.

The SPS780 Smart GPS Antenna offers contractors an easy-to-use, wide area measurement system for a variety of site preparation and grade checking applications. It can be used as either a rover for site measurement and stakeout or as a base station for site measurement and machine control operations. As a base station, the SPS780 takes little or no setup time and only requires a single keystroke each day to start up.

Basic, Max and Extreme Options – The SPS780 Smart GPS Antenna gives you three options to choose from–Basic, Max and Extreme.

Standard System Features

- Small, lightweight design – 1.31 kg (2.89 lb) (receiver only with battery) 3.7 kg (8.16 lb) complete system weight (Rover including controller and rod)
- Quick setup, high mobility base and rover receiver system ideal for small to mid size jobsites and for working on multiple jobsites on a daily or weekly basis.
- 24-channel L1/L2 GPS receiver
- Performs all site measurement and stakeout operations within 1.5 km (Basic), >5 km (Max or Extreme)
- Internal, removable, smart Li Ion battery provides up to 5.5 hrs GPS rover operation per battery. Batteries can be changed when flat, and returned to office or truck for charging leaving the receivers working in the field.
- Bluetooth® wireless technology for cable free, no hassle base or rover operation
- Simple keypad with on/off key and LED indicators for power, radio and satellite tracking
- 10 Hz update rate (Max and Extreme rovers); 2 Hz update rate (Basic rovers)
- Allows measurement from a moving platform e.g. mounted on a vehicle, boat or ATV for increased efficiency on large jobsites.

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System Option Features

Basic option features

- Rover-only receiver option
- 2 Hz measurement update rate
- 1.5 km (0.93 mile) operational range from the base station
- Entry level price point for lower cost of rover system ownership
- Ideal for contractors new to GPS as a starter system or operating multiple small projects
- Upgradeable to Max capability

Max option features

- Base station or base/rover receiver options
- Rover option offers 10 Hz measurement update rate
- Unrestricted rover operation range from the base station
- Rover operates within a VRS network for base station-free rover capability
- Integrated transmit radio with unlimited range in the base station configuration*
- Ideal for contractors operating mid to large size projects with machine control

  * 450 MHz solution only, 900 MHz variant has no integrated radio in the base station package

Extreme option features

- Base/Rover receiver interchangeability for ultimate GPS fleet flexibility
- Rover option offers 10 Hz measurement update rate
- Unrestricted rover operation range from the base station
- Either receiver can operate within a VRS network for base station-free rover capability
- L2C GPS signal modernization capability for enhanced performance in tough GPS environments
- Integrated transmit/receive radio provides base station and rover operation capability*

  *450 MHz solution only, 900 MHz variant has an integrated receive only radio in the receiver

Specifications

General characteristics	Specifications
Keyboard and display	On / Off key for one button start up
LED indicators	For satellite tracking, radio link reception and power monitoring
Receiver type	Fully integrated “Smart” GPS antenna

Physical characteristics	Specifications
Dimensions (WxH)	19 cm (7.5 in) x 10 cm (3.9 in) including connectors
Weight	1.28 kg (2.88 lb) receiver only with internal battery 3.70 kg (8.16 lbs) complete system weight (Rover including controller and pole)
Temperature[4] Operating Storage	 –40 °C to +65 °C (–40 °F to +149 °F) –40 °C to +75 °C (–40 °F to +167 °F)
Humidity	100%, condensing
Waterproof	IPX7 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 To 40 G, 10 msec, sawtooth MIL-STD-810F, FIG.514.5C-1

Performance characteristics	Specifications
Measurements	Advanced Trimble Maxwell™ Custom GPS chip • High-precision multiple correlator for L1 and L2 pseudorange measurements • Unfiltered, unsmoothed pseudorange 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 support • Trimble R-Track™ technology for tracking the new L2C Civil Signal - GPS modernization (Extreme option only)
Code differential GPS positioning[1] Horizontal accuracy Vertical accuracy WAAS differential positioning accuracy	 ±(0.25 m + 1 ppm) RMS ±(0.5 m + 1 ppm) RMS Typically <5m 3D RMS

Performance characteristics	Specifications
Real Time Kinematic (RTK) positioning [1] Horizontal Vertical	 ±(10 mm + 1 ppm) RMS, ±(0.032 ft +1 ppm) RMS ±(20 mm + 1 ppm) RMS, ±(0.065 ft +1 ppm) RMS
Initialization time Regular RTK operation with base station	Single/Multi-base minimum 10 seconds + 0.5 times baseline length in km, up to 30 km
RTK operation with Scalable GPS infrastructure	<30 seconds typical anywhere within coverage area (Max and Extreme options only)
Initialization reliability[3]	Typically >99.9%

Electrical characteristics	Specifications
Power	11 to 28 VDC external power input with over-voltage protection on Port 1 (7-pin Lemo)
Battery	Rechargeable, removable 7.4 V, 2.0 Ah Lithium–Ion battery in internal battery compartment.
Power consumption	<2.5 W, in RTK mode with internal radio
Rover operation times on internal battery 450 MHz systems 900 MHz systems	 Receive only 5.5 hrs; varies with temperature Receive only 5.5 hrs: varies with temperature
Base station operation times on internal battery 450 MHz systems 900 MHz systems	 Approximately 3.5 hrs; varies with temperature Approximately 5.5 hrs; varies with temperature
Certification	Class B Part 15, 22, 24 FCC certification, Canadian FCC, CE mark approval and C-tick approval

Communications characteristics	Specifications
Communications	Port 1 - 3-wire RS-232 (7-pin 0S Lemo) Port 2 - Full RS-232 (Dsub 9-pin) Fully integrated, fully sealed 2.4 GHz Bluetooth[5]
Integrated Radios 450MHz Transmitter radio power output	Fully integrated, fully sealed internal 450 MHz, TX, RX or TXRX[7] Fully integrated, fully sealed internal 900 MHz, RX only[8,9] 0.5 w
Receiver position update rate SPS780 Basic SPS780 Max and Extreme	 1 Hz and 2 Hz positioning 1 Hz, 2 Hz, 5 Hz, and 10 Hz positioning
Data Input and Output	CMR II, CMR+, RTCM 2.1, RTCM 2.3, RTCM 3.0
Outputs	14 NMEA, GSOF and RT17
Carrier	Supports BINEX and smoothed carrier

450 MHz integrated radio capabilities	Base Station Receiver	Rover Receiver
SPS780 Basic	N/A	Receive only
SPS780 Max	Transmit only	Receive only
SPS780 Extreme	Transmit and Receive	Transmit and Receive

900 MHz integrated radio capabilities	Base Station Receiver	Rover Receiver
SPS780 Basic	N/A	Receive only
SPS780 Max	No radio	Receive only
SPS780 Extreme	Receive only	Receive only

Base/Rover operations capability

Receiver	Specifications
SPS780 Basic	Rover only
SPS780 Max	Base and Rover
SPS780 Extreme	Base/Rover interchangeable; i.e. receivers are identical

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

Receiver	Specifications
SPS780 Basic	1.5 km
SPS780 Max and SPS780 Extreme	Unrestricted (limited to radio coverage only). Typically 3-5 km without repeater radio.

Rover operation within a VRS network using cellular phone dial up

Receiver	Specifications
SPS780 Basic	No
SPS780 Max and SPS780 Extreme	Enabled

Notes:

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 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. The availability of the L2C code is dependent on the US government

7. RX option only on Basic, TX or RX option on Max, TXRX option on Extreme

8. RX option on Basic, Max and Extreme receivers only

9. 900 MHz Max base station has no radio

Specifications are subject to change without notice.