Specifications

Trimble SPS986 GNSS Smart Antenna

Receiver Name	**SPS986 GNSS Smart Antenna**
Configuration Option	
Base and Rover interchangeability	Yes, upgradeable to Rover, Base or Rover / Base
Rover position update rate	1 Hz, 2 Hz, 5 Hz, 10 Hz, 20 Hz
Rover maximum range from base radio	Unrestricted, typical range 2–5 km (1.2–3 miles) without radio repeater
Rover operation within a VRS™ network	Yes
Heading and Moving Base operation	Yes - option[7]
Factory options	See Receiver Upgrades below
General	
Keyboard and display	LED indicators for satellite tracking, radio link status, WiFi and power On/Off key for one-button startup
Dimensions (L × W × D)	13.9 cm (5.5 in) Diameter × 13 cm (5.1 in) including connectors
Weight	1.55 kg (3.42 lb) receiver only including radio and battery Complete system (rover including controller and pole) 3.9 kg (8.6 lbs)
Temperature	
Operating[1]	–40 °C to +65 °C (–40 °F to +149 °F)
Storage	–40 °C to +75 °C (–40 °F to +167 °F)
Humidity	100%, condensing
Ingress protection	IP68 Certified per IEC-60529 - waterproof/dustproof (1m submersion for 1hr)
Shock and Vibration	
Pole drop	Designed to survive a 2 m (6.6 ft) pole drop onto concrete
Shock – Non-operating	75 Gs at 6msec
Shock – Operating	40 Gs at 10msec
Vibration	Mil-Std-810G, FIG 514.6E-1 Cat 24, Mil-Std-202G, FIG 214-1, Condition D
Measurements	
	Advanced Trimble Technology Custom GNSS chips
	High-precision multiple correlator for GNSS pseudorange measurements
	Unfiltered, unsmoothed pseudo-range measurements data for low noise, low multipath error, low-time domain correlation, and high-dynamic response
	Very low noise carrier phase measurements with <1 mm precision in a 1 Hz bandwidth
	Trimble EVEREST+ multipath signal rejection
	MSS Band: CenterPoint RTX and OmniSTAR by subscription
	Trimble xFill for short gaps in correction messages
	GPS L1 C/A, L2C, L2E (Trimble method for tracking unencrypted L2P) upgradable to L5. 672 channels
	Upgradeable to GLONASS L1/L2C/A, L2P Full Cycle Carrier
	Upgrade to Galileo L1 CBOC, E5A, E5B & E5AltBOC8 and BeiDou B1,B1C, B2,B3 Able to track 3rd generation BeiDou signals
	Integrated MEM's sensor for eBubble
	4-channel SBAS L1 C/A, L5 (WAAS/EGNOS/MSAS/GAGAN)
	QZSS: L1 C/A, L1C, L1 SAIF, L2C, L5
SBAS (WAAS/EGNOS/MSAS) Positioning[3]	

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Accuracy	Horizontal ± 0.50m (1.6 ft), Vertical ± 0.85m (2.8 ft)
Code Differential GPS Positioning[2]	
Horizontal accuracy	0.25 m + 1 ppm RMS (0.8 ft + 1 ppm RMS)
Vertical accuracy	0.50 m + 1 ppm RMS (1.6 ft + 1 ppm RMS)
OmniSTAR® Positioning	
VBS service accuracy	Horizontal <1 m (3.3 ft)
XP service accuracy	Horizontal 0.2 m (0.66 ft), Vertical 0.3 m (1.0 ft)
HP service accuracy	Horizontal 0.1 m (0.33 ft), Vertical 0.15 m (0.5 ft)
CenterPoint® RTX Positioning	
Accuracy[12]	Horizontal 2cm (0.06 ft) RMS, Vertical 5cm (0.16 ft) RMS
Convergence time for specified precisions[12]	5 minutes in select regions, and within 30 minutes worldwide
xFill Positioning	
xFill accuracy	RTK11 + 10mm(0.03 ft)/min Horiz. + 20mm(0.06 ft)/min Vert. RMS
Location RTK Positioning	
Horizontal accuracy	Location RTK (10/10) or (10/2) 10 cm + 1 ppm RMS (0.32 ft + 1 ppm)
Vertical accuracy	Location RTK (10/10) 10 cm + 1 ppm RMS (0.32 ft + 1 ppm) Location RTK (10/2) 2 cm + 1 ppm RMS (0.065 ft + 1 ppm)
Real-Time Kinematic (RTK up to 30 km) Positioning[2]	
Horizontal accuracy	8 mm + 1 ppm RMS (0.026 ft + 1 ppm RMS)
Vertical accuracy	15 mm + 1 ppm RMS (0.05 ft +1 ppm RMS)
Tilt Compensation (RTK, < 30° of tilt)[13]	
Horizontal accuracy	8 mm RTK + 8 mm Tilt Compensation + 0.5 mm per degree of tilt + 1 ppm RMS (0.026 ft + 0.026 ft + 0.001 ft + 1 ppm RMS)
Vertical accuracy	15 mm + 1 ppm RMS (0.05 ft +1 ppm RMS)
Trimble VRS[9]	
Horizontal accuracy	8 mm + 0.5 ppm RMS (0.026 ft +0.5 ppm)
Vertical accuracy	15 mm + 0.5 ppm RMS (0.05 ft +0.5 ppm)
Precise Heading	
Heading accuracy	When combined with SPS986[7]
2 m antenna separation	0.09° RMS
10 m antenna separation	0.05° RMS
High Precision Static	
Horizontal accuracy	3 mm + 0.1 ppm RMS (0.01 ft +0.1 ppm)
Vertical accuracy	3.5 mm + 0.4 ppm RMS (0.011 ft +0.4 ppm)
Initialization Time	
Regular RTK operation with base station	Single/Multi-base
	typically less than 8 seconds
Initialization reliability[4]	>99.9%
Power	
Internal	Rechargeable, removable 7.4 V, 2.8 Ah Lithium-ion battery in internal battery compartment Internal battery operates as a UPS during an ext power source failure Internal battery will charge from external power source as long as source can support the power drain and is more than 11.8 VDC Integrated charging circuitry
Power	

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External	External power input with over-voltage protection on Port 1 (7-pin Lemo 2-key). Minimum 10.8 V, Maximum 28 VDC, shutdown optmized for 12V lead acid battery operation
	Power source supply (Internal/External) is hot-swap capable in the event of power source removal or cut off
	DC external power input with over-voltage protection on Port 1 (Lemo)
	Receiver automatically turns on when connected to external power
Power over Ethernet (PoE)	N/A
Power consumption	3.2 W in rover mode with internal receive radio
	5.2 W in base mode with internal 0.5 W transmit radio

Operation Time on Internal Battery

Rover	5.5 hours; varies with temperature
Base station	
450 MHz systems	Approximately 4 hours; varies with temperature[5]
900 MHz systems	Approximately 4 hours; varies with temperature

Regulatory Approvals

	FCC Part 15 Subpart B (Class B Device), Part 15.247, Part 90
	Canadian ICES-003. Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.
	Canadian RSS-310, RSS-210, and RSS-119. Cet appareil est conforme à la norme CNR-310, CNR-210, et CNR-119 du Canada.
	IEC 60950-1 2nd Edition
	CISPR 32, EN 55032, EN55024
	RCM mark,ANS/NZS 4768
	Radio Equipment Directive (RED 2014/53/EU)
	Japan MIC
	CE mark
	RoHS compliance
	WEEE compliance

Communications

Lemo (Serial 1)	7-pin Lemo 2-key, Power Input, USB. Optional USB to RS232 serial cable. Receiver supports RNDIS communications over USB
1PPS (1 Pulse-per-second)	N/A
Ethernet	N/A
WiFi	Client or Access Point. Receive or transmit corrections. WiFi b/g
Bluetooth wireless technology	Fully-integrated, sealed 2.4 GHz Bluetooth module[6].
Integrated radios (optional)	Fully-integrated, fully-sealed internal 403-473 MHz; Internal 900 MHz; Rx/Tx
Channel spacing (450 MHz)	12.5 kHz or 25 kHz spacing available
Sensitivity (450 MHz)	-114 dBm (12 dB SINAD)
450 MHz output power	0.5 W, 2W
900 MHz output power	1.0 W
Frequency approvals (902-928 MHz)	USA/Canada

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External GSM/GPRS, cell phone support	Supported for direct-dial and Internet-based correction streams using the SCS900 software Cell phone or GSM/GPRS modem inside external controller
Receiver position update rate	1 Hz, 2 Hz, 5 Hz, 10 Hz, and 20 Hz positioning
Correction data input	CMR™, CMR+™, CMRx™, RTCM 2.x, RTCM 3 (require Rover upgrade)
Correction data output	CMR, CMR+, CMRx, RTCM 2.x, RTCM 3 (require Base upgrade)
Data outputs	NMEA, GSOF

Receiver Upgrades

Precision upgrades	Location RTK (10/2), (10/10), or (30/30)
	Precision RTK Rover, Base or Rover/Base. IMU (Tilt Correction)
Signal / Constellation upgrades	L5 (Triple Frequency), GLONASS, GALILEO, BeiDou GNSS[10]
Feature upgrades	4 GB Internal Data Logging. Moving Base and Heading

Notes

1 Receiver will operate normally to those temperature limits. Internal batteries will operate from –20 °C to +48 °C

2 Accuracy and reliability may be subject to anomalies such as multipath, obstructions, satellite geometry, interference and atmospheric conditions. Always follow recommended survey practices.

3 Depends on SBAS system performance.

4 May be affected by atmospheric conditions, signal multipath, and satellite geometry. Initialization reliability is continuously monitored to ensure highest quality.

5 If your receiver is transmitting 2.0 W (450 MHz), you will experience reduced battery performance compared to the 0.5 W solution.

6 Bluetooth type approvals are country specific. For more information, contact your local Trimble office or representative.

7 When receiver is combined with an SPS986 with Moving Base installed or other suitable SPS receivers.

8 Galileo Commercial Authorization
Developed under a Licence of the European Union and the European Space Agency.

9 Networked RTK PPM values are referenced to the closest physical base station

10 This Trimble SPS Receiver is capable of supporting existing and planned GNSS satellite signals, including GPS, GLONASS, GALILEO, BeiDou and QZSS, and existing and planned augmentations to these GNSS systems.

11 RTK refers to the last reported precision before the correction source was lost and xFill started

12 Receiver accuracy and convergence time varies based on GNSS constellation health, level of multipath, and proximity to obstructions such as large trees and buildings.

13 Proper survey techniques should be followed to reduce multipath error and maintain a good line of sight to the sky for satellite tracking. At greater than 30° of tilt, accuracy at the rod tip may decrease more than specified.

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Specifications subject to change without notice.

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