

Specifications

Trimble SPS651 Modular GPS Receiver



Receiver Name	SPS651 Location GPS Receiver
Configuration Option	
Type Base and rover interchangeability Base operation Rover operation Heading operation Rover position update rate Rover maximum range from base Rover operation within a VRS™ network Factory options	Modular Yes DGPS RTCM only SPS651 SPS651 ⁶ 1 Hz, 2 Hz, 5 Hz, 10 Hz Unlimited Location RTK and DGPS RTCM only L2C, GLONASS
General	
Keyboard and display Dimensions (L x W x D) Weight	VFD display 16 characters by 2 rows On/Off key for one-button startup Escape and Enter keys for menu navigation 4 arrow keys (up, down, left, right) for option scrolls and data entry 24 cm (9.4 in) x 12 cm (4.7 in) x 5 cm (1.9 in) including connectors 1.65 kg (3.64 lb) receiver with internal battery and radio 1.55 kg (3.42 lb) receiver with internal battery and no radio
Antenna Options	
GA510 GA530 L1/Beacon, DSM 232 Zephyr™ Model 2 Zephyr Geodetic™ Model 2 Zephyr Model 2 Rugged Zephyr, Zephyr Geodetic, Z-Plus, Micro-Centered™	L1/L2/L2C GPS, SBAS, and OmniSTAR (optimised for OmniSTAR) L1/L2/L2C GPS, SBAS, and OmniSTAR Not supported L1/L2/L2C GPS, GLONASS, SBAS, and OmniSTAR L1/L2/L2C GPS and DGPS Base Station L1/L2/L2C GPS, SBAS, and OmniSTAR Refer to antenna specification
Temperature	
Operating Storage Humidity Waterproof	-40 °C to +65 °C (-40 °F to +149 °F) ¹ -40 °C to +80 °C (-40 °F to +176 °F) MIL-STD 810F, Method 507.4 IP67 for submersion to depth of 1 m (3.3 ft), dustproof
Shock and Vibration	
Drop Shock – Non-operating Shock – Operating Vibration	Designed to survive a 1 m (3.3 ft) pole drop onto a hard surface To 75 g, 6 ms To 40 g, 10 ms, saw-tooth Tested to Trimble ATV profile (4.5 g RMS): 10 Hz to 300 Hz: 0.04 g/Hz; ² 300 Hz to 1,000 Hz; -6 dB/octave

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Measurements

Advanced Trimble Maxwell™ 5 Custom GPS chip
High-precision multiple correlator for L1/L2 pseudo-range 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

L1/L2 signal-to-noise ratios reported in dB-Hz
Proven Trimble low elevation tracking technology
72-channel L1 C/A code, L1/L2 Full Cycle Carrier. Upgradable to L2C and
GLONASS L1/L2 Full Cycle Carrier
Trimble EVEREST™ multipath signal rejection
4-channel SBAS (WAAS/EGNOS/MSAS)

Code Differential GPS Positioning²

Correction type	DGPS RTCM 2.x
Correction source	DGPS Base via external radio or Internet
Horizontal accuracy	$\pm(0.25\text{m} + 1 \text{ ppm})$ RMS $\pm(0.8 \text{ ft} + 1 \text{ ppm})$
Vertical accuracy	$\pm(0.50\text{m} + 1 \text{ ppm})$ RMS $\pm(1.6 \text{ ft} + 1 \text{ ppm})$

SBAS (WAAS/EGNOS/MSAS) Positioning³

Horizontal accuracy	Typically <1 m (3.3 ft)
Vertical accuracy	Typically <5 m (16.4 ft)

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)

Location RTK Positioning²

Horizontal accuracy	0.07 m + 1 ppm RMS (0.23 ft + 1 ppm RMS)
Vertical accuracy	0.02 m + 1 ppm RMS (0.065 ft + 1 ppm RMS)

Precise Heading

Heading accuracy	When combined with SPS551H ⁶
2 m antenna separation	0.06° RMS
10 m antenna separation	0.05° RMS

Power

Internal	Rechargeable, removable 7.4 V, 2.4 Ah Lithium-ion battery in internal battery compartment Internal battery operates as a UPS in the event of external power source failure
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External	Power input on 7-pin 0-shell Lemo connector is optimized for lead acid batteries with a cut-off threshold of 10.5 V Power input on the 26-pin D-sub connector is optimized for Trimble lithium-ion battery input with a cut-off threshold of 9.5 V Power source supply (Internal/External) is hot-swap capable in the event of power source removal or cut off 9.5 V DC to 28 V DC external power input with over-voltage protection Receiver automatically turns on when connected to external power NA
Power over Ethernet (PoE)	NA

Power consumption	6.0 W in rover mode with internal receive radio 8.0 W in base mode with internal transmit radio
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Operation Time on Internal Battery

Rover
Base station
450 MHz systems

13 hours; varies with temperature
SPS651 DGPS RTCM
Approximately 11 hours⁴; varies with temperature

Regulatory Approvals

FCC: Part 15 Subpart B (Class B Device) and Subpart C, 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.
R&TTE Directive: EN 301 489-1/-5/-17, EN 300 440, EN 300 328, EN 300 113, EN 60950, EN 50371
ACMA: AS/NZS 4295 approval
CE mark compliance
C-tick mark compliance
UN ST/SG/AC.10.11/Rev. 3, Amend. 1 (Lithium-ion Battery)
UN ST/SG/AC. 10/27/Add. 2 (Lithium-ion Battery)
RoHS compliant (excludes those with an internal 900 MHz radio)
WEEE compliant

Communications

Lemo (Serial)
Modem 1 (Serial)
Modem 2 (Serial)
1PPS (1 pulse-per-second)
Ethernet
Bluetooth wireless technology
Integrated radios (optional)

Channel spacing (450 MHz)
450 MHz output power
900 MHz output power
Frequency approvals (900 MHz)

7-pin OS Lemo, Serial 1, 3-wire RS-232
26-pin D-sub, Serial 2, Full 9-wire RS232, using adaptor cable
26-pin D-sub, Serial 3, 3 wire RS-232, using adaptor cable
Available
Through a multi-port adaptor
Fully-integrated, fully-sealed 2.4 GHz Bluetooth⁵ module
Fully-integrated, fully-sealed internal 450 MHz (UHF) Tx/Rx; Internal 900 MHz Tx/Rx
12.5 kHz or 25 kHz spacing available
0.5 W, 2.0 W (2.0 W available only in certain countries)
1.0 W
USA/Canada (-10)
New Zealand/Australia (-20)
Australia (-30)

External GSM/GPRS, cell phone support

Supported for direct-dial and Internet-based correction streams – directly or using the SCS900 software
Cell phone or GSM/GPRS modem inside controller

Internal MSK Beacon receiver

NA

Correction data input
Correction data output
Data outputs

CMR™, CMR+™, RTCM 3, RTCM 2.x
CMR/CMR+, RTCM 2.x
NMEA, GSOFF, 1PPS Time Tags

Receiver Upgrades

Notes

1 Receiver will operate normally to -40°C . Internal batteries are rated to -20°C .

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

3 Depends on SBAS system performance.

4 If your receiver has the 2.0 W upgrade, you will experience reduced battery performance compared to the 0.5 W solution.

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

6 When receiver is combined with an SPS551H or other suitable SPSx51 receiver.

Specifications subject to change without notice.

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