

GEOMATE

High-Tech Precision. High-Touch Service.



GEOMATE SG20AR

PALM-SIZE VISUAL IMU-RTK RECEIVER



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The GeoMate SG20AR is an advanced GNSS RTK receiver, designed in Singapore to deliver exceptional performance in a compact, lightweight solution. Weighing just 450 g, its palm-size form factor enhances portability, making it ideal for professionals who require mobility in the field.

This innovative SG20AR receiver integrates GNSS, AUTO-IMU, and dual 2 MP cameras, enabling seamless visual navigation and CAD visual stakeout functionality. With its advanced visual stakeout capabilities, the SG20AR enhances efficiency by 50%, streamlining workflows and minimizing time on site. Featuring 1608 channels and multi-constellation support, including GPS, GLONASS, Galileo, BeiDou, and more, the SG20AR ensures superior positioning accuracy in even the most challenging environments. Engineered to withstand harsh conditions with an IP68 rating, it combines durability with unparalleled precision and reliability, making it the preferred choice for surveyors worldwide.

TECHNICAL SPECIFICATIONS

GNSS Performance⁽¹⁾

Channels	1608 channels
GPS	L1C/A, L2C, L2P(Y), L5
GLONASS	L1, L2, L3*
Galileo	E1, E5a, E5b, E6*
BeiDou	B1I, B2I, B3I, B1C, B2a, B2b*
QZSS	L1C/A, L1C, L2C, L5
NavIC/ IRNSS	L5
PPP	B2b-PPP, E6B-HAS
SBAS	EGNOS (L1, L5*)

GNSS Accuracies⁽²⁾

Real time kinematic (RTK)	Horizontal: 8 mm + 1 ppm RMS Vertical: 15 mm + 1 ppm RMS Initialization time: < 10 s Initialization reliability: > 99.9%
Post-processing kinematic (PPK)	Horizontal: 3 mm + 1 ppm RMS Vertical: 5 mm + 1 ppm RMS
Post-processing static	Horizontal: 2.5 mm + 0.5 ppm RMS Vertical: 5 mm + 0.5 ppm RMS
Code differential	Horizontal: 0.4 m RMS Vertical: 0.8 m RMS
Autonomous	Horizontal: 1.5 m RMS Vertical: 2.5 m RMS
Visual stakeout	H: 8 mm + 1 ppm RMS V: 15 mm + 1 ppm RMS
Positioning rate ⁽³⁾	1 Hz, 5 Hz and 10 Hz
Time to first fix ⁽⁴⁾	Cold start: < 45 s Hot start: < 10 s Signal re-acquisition: < 1 s
IMU update rate	200 Hz
Tilt angle	0-60°
RTK tilt-compensated	Additional horizontal pole-tilt uncertainty typically less than 8 mm + 0.7 mm/° tilt down to 30°

Environments

Temperature	Operating: -40°C to +65°C (-40°F to +149°F) Storage: -40°C to +85°C (-40°F to +185°F)
Humidity	100% non-condensation
Ingress protection	IP68 ⁽⁵⁾ (according to IEC 60529)
Drop	Survive a 2-meter pole-drop
Waterproof and breathable membrane	Prevent water vapor from entering under harsh environments.

Electrical

Charging time	Full charge in 4.5 hours
Li-ion battery capacity	Built-in non-removable battery
Operating time on internal battery ⁽⁶⁾	UHF/ 4G RTK Rover w/o camera: up to 17 h Visual Stakeout: up to 10 h Static: up to 22 h
External power input	Type-C 5 V / 2 A

Hardware

Size (LxWxH)	Φ106 mm x 55.6 mm (Φ 4.17 in × 2.1 in)
Weight	450 g (0.99 lb)
Front panel	2 synchronized LED + 1 Button
Tilt sensor	Calibration-free IMU for pole-tilt compensation. Immune to magnetic disturbances. E-Bubble leveling.

Cameras

Sensor pixels	Dual 2 MP cameras
Aperture	F2.4
Video frame rate	30 fps
Features	MateSurvey software, support Visual Navigation, Visual Stakeout.

Communication

Wireless connection	NFC for device touch pairing
Wi-Fi	Wi-Fi 2.4G 802.11 b/g/n Wi-Fi 5G 802.11ac
Bluetooth®	v 4.2, backward compatible
Ports	1 x USB Type-C port (external power, data download, OTG firmware update) 1 x UHF antenna port (SMA female)
UHF radio ⁽⁷⁾	Internal Rx Only: 410 - 470 MHz Protocol: Transparent, TT450 Link rate: 9600 bps to 19200 bps
Data formats	RTCM 2.x, RTCM 3.x, CMR input / output; RINEX 2.11, 3.02 NMEA 0183 output; NTRIP Client, NTRIP Caster
Data storage	8 GB high-speed memory

Compliance with Laws and Regulations

International standards	RED 2014/53/EU, IEC 62368-1, FCC PART 15, IEC 62133-2, UN38.3
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*All specifications are subject to change without notice.

(1) Compliant, but subject to availability of BDS ICD, GLONASS, Galileo, QZSS and IRNSS commercial service definition. GLONASS L3, Galileo E6, Galileo E6 High Accuracy Service (HAS), BDS B2b and SBAS L5 will be provided through future firmware upgrade. (2) Accuracy and reliability are determined under open sky, free of multipaths, optimal GNSS geometry and atmospheric condition. Performances assume minimum of 5 satellites, follow up of recommended general GPS practices. (3) Compliant and 10 Hz to be provided through future firmware upgrade. (4) Typical observed values. (5) Splash, water, and dust resistant and were tested under controlled laboratory conditions with a rating of IP68 under IEC standard 60529. (6) 4900 mAh, 7.2 V internal battery. Battery life is subject to operating temperature. (7) The use of UHF datalink may be subject to local regulations. Users must ensure that the device is not operated without the permission of the local authorities on frequencies or power output other than those specifically reserved and intended for use without required permit.

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