



GEOMATE SG20AR

PALM-SIZE VISUAL IMU-RTK RECEIVER

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.



GeoMate SG20AR

GNSS Receiver 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*
OZSS	L1C/A, L1C, L2C, L5
NavIC/ IRNSS	L5
PPP	Support PPP: B2b-PPP, E6B-HAS H: 10 cm V: 20 cm
SBAS	EGNOS (L1, L5*)

GNSS Accuracies ⁽²⁾

Real Time Kinematics (RTK)	Horizontal: 8mm + 1 ppm RMS Vertical: 15mm + 1 ppm RMS Initialization time: < 10 s Initialization reliability: > 99.9%
Post-processing kinematics (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	Horizontal: 8 mm + 1 ppm RMS Vertical: 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°

Hardware

Size (LxWXH)	Φ4.69 in x 3.35 in (Φ119 mm x 85 mm)
Weight	450 g (0.99 lb)
Front Panel	2 Synchronized LED + 1 Button
Temperature	Operating: -40°F to +149°F (-40°C to +65°C) Storage: -40°F to +185°F (-40°C to +85°C)
Humidity	100% non-condensation
Ingress Protection	IP68 ⁽⁵⁾ (according to IEC 60529)
Drop	Survive to 2-meter pole drop
Waterproof and breathable membrane	Prevent water vapor from entering under harsh environments
Tilt sensor	Calibration-free IMU for pole-tilt compensation. Immune to magnetic disturbances. E-Bubble leveling.

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 17h Visual Stakeout: up to 10 h Static: up to 22 h
External power input	Type-C 5 V / 2 A

Cameras

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

Communication

Wi-Fi	802.11 b/g/n, access point mode
Bluetooth®	V4.2
Ports	1 x USB Type-C port (external power, data download, firmware update) 1 x UHF antenna port (TNC female)
UHF radio ⁽⁷⁾	Standard Internal Rx/Tx ⁽⁸⁾ : 410-470 MHz Transmit Power: 0.5 W, 1 W Protocol: Transparent, TT450, Satel ⁽⁹⁾ Link Rate: 9,600 bps to 19,200 bps Range: Typical 3km, up to 5km with optimal conditions
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 internal 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, OZSS 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. Performance 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. (8) Supported after the product upgrade in April 2025. For details, please kindly contact authorized GEOMATE dealer or regional business team. (9) Compliant and Satel protocol to be provided through future firmware upgrade.



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