BENCHMARK
TOOL AND SUPPLY, INC

F8 GNSS Receiver

Benchmark Tool & Supply's F8 combines vision, GNSS, and IMU technologies to deliver fast, accurate surveying in challenging environments. Dual cameras enable real-time visual stakeout around obstacles without complex offset methods.

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*
NavIC/IRNSS	L5
SBAS	EGNOS (L1, L5*)
PPP	B2b-PPP, E6B-HAS

IMU Sensor	
IMU Type	4D AUTO-IMU
IMU Update Rate	200Hz
IMU Tilt Angle	0-60°
Additional Horizontal Pole-tilt	Typically less than 2.5 cm within 30°

GNSS Accuracies [2]	
Real Time Kinematics (RTK)	Horizontal: 8 mm + 1 ppm RMS Vertical: 15 mm + 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
PPP	Support PPP-B2b, E6B-HAS H: 10cm | V: 20cm
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
Vision Survey	Typical 2~4 cm ,range 2~10 m
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

Technical Specifications

Hardware	
Size (L x W x H)	Φ134 mm x 80 mm(Φ 5.28 in × 3.15 in)
Weight	1.65 lb. (750 g)
Front Panel	1 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	IP67 waterproof and dustproof, protected from temporary immersion to depth of 1 m
Shock Resistance Grade	IK08
Drop	Survive a 2-meter pole drop
Tilt Sensor	Calibration-free IMU for pole-tilt compensation. Immune to magnetic disturbance

Camera	
Sensor Pixels	2 MP
Field of View	75°
Video Frame Rate	25 fps
Image Group Capture	Typical 2 Hz capturing rate, up to 25 Hz Max. capturing time: 60 s, size of an image group appr. 60 MB

Communication	
Wi-Fi	Wi-Fi 2 .4G 802.1 1 b/g/n Wi-F i 5G 802.11ac
Bluetooth	v 4.2
Others	NFC for device touch pairing, 13.56MHz
Ports	1 xUSB Type-Cport (external power, data download, firmware update) 1 xUHF antenna port (TNCfemale)
UHF radio [5]	Standard Internal Tx/Rx: 410 - 470 MHz Transmit Power: 0.5 W, 1W Protocol: EFIX, Transparent, TT450, Satel (6) Link rate: 9,600 bps to 19,200 bps Range: Typical 3 km, up to 8 km with optimal conditions
Data Formats	RTCM2.x, RTCM3.x, CMR input / output, Full Star RINEX2.11, 3.02 NMEA 0183 output HCN, HRC and RINEX static formats NTRIP Client, NTRIP Caster
Data Storage	8 GB high-speed memory

Electrical	
Power Consumption	Typical 2.2 W (depending on user settings)
Li-Ion Battery Capacity	Rechargeable and built-in Lithium Battery 4900mAh, 7.2 V
Operating Time on internal battery [7]	RTK Rover, UHF/ 4G mode w/o camera: up to 16.5 h RTK Rover, Vision Stakeout/Vision Survey: up to 9.5 h UHF RTK Base: up to 10 h Static: up to 22 h
External Power Output	5 V / 2 A

*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) 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.
(6) Compliant and Satel protocol to be provided through future firmware upgrade.
(7) Battery life is subject to operating temperature.