i89 SPECIFICATIONS

GNSS Performance [1]

Channels	1408 channels with iStar2.0
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, L6*
NavIC/ IRNSS	L5*
PPP	B2b-PPP
SBAS	EGNOS (L1, L5)

GNSS Accuracies [2]

Real time kinematic (RTK)	H: 8 mm + 1 ppm RMS V: 15 mm + 1 ppm RMS Initialization time: <10 s Initialization reliability: >99.9%
Post-processing kinematic (PPK)	H: 3 mm + 1 ppm RMS V: 5 mm + 1 ppm RMS
PPP	H: 10 cm | V: 20 cm
High-precision static	H: 2.5 mm + 0.1 ppm RMS V: 3.5 mm + 0.4 ppm RMS
Static and rapid static	H: 2.5 mm + 0.5 ppm RMS V: 5 mm + 0.5 ppm RMS
Code differential	H: 0.4 m RMS | V: 0.8 m RMS
Autonomous	H:1.5 m RMS | V: 2.5 m RMS
Visual stakeout [3]	H: 8 mm + 1 ppm RMS V: 15 mm + 1 ppm RMS
Visual survey	Typical 2~4 cm, range 2~15 m
Positioning rate [4]	1 Hz, 5 Hz and 10 Hz
Time to first fix [5]	Cold start: <45 s, Hot start: <10 s Signal re-acquisition: <1 s
IMU update rate	200 Hz, AUTO-IMU
Till angle	0-60°
RTK tilt-compensated	Additional horizontal pole-tilt uncertainty typically less than 8 mm + 0.7 mm/° tilt

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[6] (according to IEC 60529)
Drop	Survive a 2-meter pole-drop
Vibration	Compliant with ISO 9022-36-08 and MIL-STD-810G- 514.6-Cat.24.
Waterproof and breathable membrane	Prevent water vapor from entering under harsh environments

Electrical

Power consumption	Typical 2.2 W
Quick charge	18 W QC. Full charge in 3 hours
Operating time on internal battery [7]	UHF/ 4G RTK Rover w/o camera: up to 16.5 h Visual Stakeout/Visual Survey: up to 9.5 h UHF RTK Base: up to 10 h Static: up to 22 h
External power input	5 V / 2 A

Hardware

Size (D x H)	Φ 133 x 87 mm (Φ 5.24 x 3.43 in)
Weight	750 g (1.65 lb)
Front panel	4 LED 2 physical buttons
Tilt sensor	Calibration-free IMU for pole-tilt compensation. Immune to magnetic disturbances.

Cameras

Sensor pixels	Dual-camera, global shutter with 2 MP & 5 MP
Field of view	75°
Video frame rate	25 fps
Image group capture	Method: video photogrammetry. Rate: typically 2 Hz, up to 25 Hz. Max. capture time: 60 s with an image group size of appr. 60 MB.
Features	LandStar™software,support Visual Navigation, Visual Stakeout, Visual Survey, 3D Modeling[8]

Communication

Wireless connection	NFC for device touch pairing
Wi-Fi	802.11 b/g/n/ac, 5.8 GHz & 2.4 GHz, access point mode
Bluetooth®	v 4.2 backward compatible
Ports	1 x USB Type-C port (external power, data download, firmware update) 1 x UHF antenna port (TNC female)
Built-in UHF radio	Standard internal Tx/Rx: 410 - 470 MHz Transmit Power: 0.5 W, 1 W Protocol: CHC, Transparent, TT450, Satel Link rate: 9 600 bps to 19 200 bps Range: Typical 3 km, up to 8 km with optimal conditions
Data formats	RTCM 2.x, RTCM 3.x, CMR input / output HCN, HRC, 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	NGS Antenna Calibration, IEC 62133-2:2017+A1, IEC 62368-1:2014, UN Manual Section 38.3

*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, QZSS L6 and IRNSS 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) CHCNAV's VPT™ (Virtual Pole Tip) technology ensures precise alignment of the virtual pole tip with the red point representing the staking out location in the LandStar™ software within acceptable error margins.
(4) Compliant and 10 Hz to be provided through future firmware upgrade.
(5) Typical observed values.
(6) Splash, water, and dust resistant and were tested under controlled laboratory conditions with a rating of IP68 under IEC standard 60529.
(7) Rechargeable and built-in 7.2 V / 4900 mAh lithium battery. Battery life is subject to operating temperature.
(8) 3D Modeling feature can be activated through function code.