Trimble R12

GNSS SYSTEM

KEY FEATURES

- Next generation Trimble® ProPoint™ GNSS positioning engine. Engineered for improved accuracy and productivity in challenging GNSS conditions.
- 672-channel solution with Trimble 360 satellite tracking technology
- Trimble SurePoint™ tilt compensation and precise position capture
- Trimble xFill® correction outage technology
- Support for RTK level precision Trimble CenterPoint® RTX corrections technology
- Optimized for Trimble Access™ field software
- Android™ and iOS platform support
- Cellular, Bluetooth®, Wi-Fi data connectivity
- Military-spec rugged design and IP-67 rating
- Ergonomic form factor
- All day battery with built-in status indicator
- 6 GB internal memory

Learn more:
geospatial.trimble.com/R12

PERFORMANCE SPECIFICATIONS

GNSS MEASUREMENTS

	Constellation agnostic, flexible signal tracking and improved positioning[1] in challenging environments with Trimble ProPoint GNSS technology	
	Increased measurement productivity and traceability with Trimble SurePoint eBubble tilt compensation	
	Advanced Trimble Custom Survey GNSS chips with 672 channels	
	Reduced downtime due to loss of radio signal or cellular connectivity with Trimble xFill technology	
	Signals tracked simultaneously	GPS: L1C, L1C/A, L2C, L2E, L5 GLONASS: L1C/A, L1P, L2C/A, L2P, L3 SBAS (WAAS, EGNOS, GAGAN, MSAS): L1C/A, L5 Galileo: E1, E5A, E5B, E5 AltBOC, E6[2] BeiDou: B1, B1C, B2, B2A, B3 QZSS: L1C/A, L1S, L1C, L2C, L5, L6 NavIC (IRNSS): L5 L-band: CenterPoint RTX
	Iridium filtering above 1616 MHz allows antenna to be used up to 20 m away from iridium transmitter	
	Japanese LTE filtering below 1510 MHz allows antenna to be used up to 100 m away from Japanese LTE cell tower	
	Digital Signal Processor (DSP) techniques to detect and recover from spoofed GNSS signals	
	Advanced Receiver Autonomous Integrity Monitoring (RAIM) algorithm to detect and reject problem satellite measurements to improve position quality	
	Improved protection from erroneous ephemeris data	
	Positioning Rates	1 Hz, 2 Hz, 5 Hz, 10 Hz, and 20 Hz

POSITIONING PERFORMANCE[3]

CODE DIFFERENTIAL GNSS POSITIONING

	Horizontal	0.25 m + 1 ppm RMS
	Vertical	0.50 m + 1 ppm RMS
	SBAS[4]	typically <5 m 3DRMS

STATIC GNSS SURVEYING

High-Precision Static		
	Horizontal	3 mm + 0.1 ppm RMS
	Vertical	3.5 mm + 0.4 ppm RMS
Static and Fast Static		
	Horizontal	3 mm + 0.5 ppm RMS
	Vertical	5 mm + 0.5 ppm RMS

REAL TIME KINEMATIC SURVEYING

Single Baseline <30 km		
	Horizontal	8 mm + 1 ppm RMS
	Vertical	15 mm + 1 ppm RMS
Network RTK[5]		
	Horizontal	8 mm + 0.5 ppm RMS
	Vertical	15 mm + 0.5 ppm RMS
RTK start-up time for specified precisions[6]		2 to 8 seconds

TRIMBLE RTX™ TECHNOLOGY (SATELLITE AND CELLULAR/INTERNET (IP))

CenterPoint RTX[7]		
	Horizontal	2 cm RMS
	Vertical	5 cm RMS
	RTX convergence time for specified precisions - Worldwide	< 15 min
	RTX QuickStart convergence time for specified precisions	< 1 min
	RTX convergence time for specified precisions in select regions (Trimble RTX Fast Regions)	< 1 min

TRIMBLE XFILL[8]

	Horizontal	RTK[9] + 10 mm/minute RMS
	Vertical	RTK[9] + 20 mm/minute RMS

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HARDWARE		
PHYSICAL		
Dimensions (W×H)	11.9 cm x 13.6 cm (4.6 in x 5.4 in)	
Weight	1.12 kg (2.49 lb) with internal battery, internal radio with UHF antenna, 3.95 kg (8.71 lb) items above plus range pole, Trimble TSC7 controller & bracket	
Temperature[10]		
	Operating	–40 °C to +65 °C (–40 °F to +149 °F)
	Storage	–40 °C to +75 °C (–40 °F to +167 °F)
Humidity		100%, condensing
Ingress protection		IP67 dustproof, protected from temporary immersion to depth of 1 m (3.28 ft)
Shock and vibration (Tested and meets the following environmental standards)		
	Shock	Non-operating: Designed to survive a 2 m (6.6 ft) pole drop onto concrete. Operating: to 40 G, 10 msec, sawtooth
	Vibration	MIL-STD-810F, FIG.514.5C-1
ELECTRICAL		
	Power 11 to 24 V DC external power input with over-voltage protection on Port 1 and Port 2 (7-pin Lemo)	
	Rechargeable, removable 7.4 V, 3.7 Ah Lithium-ion smart battery with LED status indicators	
	Power consumption is 4.2 W in RTK rover mode with internal radio[11]	
Operating times on internal battery[12]		
	450 MHz receive only option	6.5 hours
	450 MHz receive/transmit option (0.5 W)	6.0 hours
	450 MHz receive/transmit option (2.0 W)	5.5 hours
	Cellular receive option	6.5 hours
COMMUNICATIONS AND DATA STORAGE		
Serial	3-wire serial (7-pin Lemo)	
USB v2.0	Supports data download and high speed communications	
Radio modem	Fully Integrated, sealed 450 MHz wide band receiver/transmitter with frequency range of 403 MHz to 473 MHz, support of Trimble, Pacific Crest, and SATEL radio protocols:	
	Transmit power	2 W
	Range	3–5 km typical / 10 km optimal[13]
Cellular[14]	Integrated, 3.5 G modem, HSDPA 7.2 Mbps (download), GPRS multi-slot class 12, EDGE multi-slot class 12, Penta-band UMTS/HSDPA (WCDMA/FDD) 800/850/900/1900/2100 MHz, Quad-band EGSM 850/900/1800/1900 MHz, GSM CSD, 3GPP LTE	
Bluetooth	Version 4.1[15]	
Wi-Fi	802.11 b,g, access point and client mode, WPA/WPA2/WEP64/WEP128 encryption	
I/O ports	Serial, USB, TCP/IP, IBSS/NTRIP, Bluetooth	
Data storage	6 GB internal memory	
Data format	CMR+, CMRx, RTCM 2.1, RTCM 2.3, RTCM 3.0, RTCM 3.1, RTCM 3.2 input and output	
	24 NMEA outputs, GSOF, RT17 and RT27 outputs, 1 PPS output	
WEBUI		
	Offers simple configuration, operation, status, and data transfer	
	Accessible via Wi-Fi, Serial, USB, and Bluetooth	
SUPPORTED CONTROLLERS & FIELD SOFTWARE		
	Trimble TSC7, Trimble T10, Trimble T7, Android and iOS devices running supported apps	
	Trimble Access 2019.10 or later	
CERTIFICATIONS		
	FCC Part 15 (Class B device), 24, 32; CE Mark; RCM; PTCRB; BT SIG	

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1 Challenging GNSS environments are locations where the receiver has sufficient satellite availability to achieve minimum accuracy requirements, but where the signal may be partly obstructed by and/or reflected off of trees, buildings, and other objects. Actual results may vary based on user's geographic location and atmospheric activity, scintillation levels, GNSS constellation health and availability, and level of multipath and signal occlusion.
2 The current capability in the receivers is based on publicly available information. As such, Trimble cannot guarantee that these receivers will be fully compatible with a future generation of Galileo satellites or signals.
3 Precision and reliability may be subject to anomalies due to multipath, obstructions, satellite geometry, and atmospheric conditions. The specifications stated recommend the use of stable mounts in an open sky view, EMI and multipath clean environment, optimal GNSS constellation configurations, along with the use of survey practices that are generally accepted for performing the highest-order surveys for the applicable application including occupation times appropriate for baseline length. Baselines longer than 30 km require precise ephemeris and occupations up to 24 hours may be required to achieve the high precision static specification.
4 Depends on SBAS system performance.
5 Network RTK PPM values are referenced to the closest physical base station.
6 May be affected by atmospheric conditions, signal multipath, obstructions and satellite geometry. Initialization reliability is continuously monitored to ensure highest quality.
7 RMS performance based on repeatable in field measurements. Achievable accuracy and initialization time may vary based on type and capability of receiver and antenna, user's geographic location and atmospheric activity, scintillation levels, GNSS constellation health and availability and level of multipath including obstructions such as large trees and buildings.
8 Accuracies are dependent on GNSS satellite availability. xFill positioning without a Trimble CenterPoint RTX subscription ends after 5 minutes of radio downtime. xFill positioning with a CenterPoint RTX subscription will continue beyond 5 minutes providing the Trimble RTX solution has converged, with typical precisions not exceeding 6 cm horizontal, 14 cm vertical or 3 cm horizontal, 7 cm vertical in Trimble RTX Fast regions. xFill is not available in all regions, check with your local sales representative for more information.
9 RTK refers to the last reported precision before the correction source was lost and xFill started.
10 Receiver will operate normally to –40 °C, internal batteries are rated from –20 °C to +60 °C (ambient +50 °C).
11 Tracking GPS, GLONASS and SBAS satellites.
12 Varies with temperature and wireless data rate. When using a receiver and internal radio in the transmit mode, it is recommended that an external 6 Ah or higher battery is used.
13 Varies with terrain and operating conditions.
14 Due to local regulations, the integrated cellular modem cannot be enabled in China, Taiwan, or Brazil. A Trimble controller integrated cellular modem or external cellular modem can be used to obtain GNSS corrections via an IP (Internet Protocol) connection.
15 Bluetooth type approvals are country specific.

Specifications subject to change without notice.

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