



# Trimble R10

## GNSS SYSTEM

### A NEW LEVEL OF PRODUCTIVITY

Collect more accurate data faster and easier – no matter what the job or the environment, with the Trimble® R10 GNSS System. Built with powerful technologies integrated into a sleek design, this unique system provides Surveyors with a powerful way to increase productivity in every job, every day.

#### Trimble HD-GNSS Processing Engine

The advanced Trimble HD-GNSS processing engine provides markedly reduced convergence times as well as high position and precision reliability while reducing measurement occupation time. Transcending traditional fixed/float techniques, it provides a more accurate assessment of error estimates than traditional GNSS technology.

#### Trimble SurePoint

With Trimble SurePoint™ technology, advanced sensors onboard the Trimble R10 continuously stream pole tilt and heading information that is used to display an electronic level bubble on the Trimble controller screen, allowing surveyors to maintain focus where it matters most. Full tilt compensation allows the survey pole to be tilted up to 15° when measuring, allowing the Trimble R10 to capture points that would be inaccessible to other GNSS surveying systems.

#### Trimble 360 Receiver

Powerful Trimble 360 receiver technology in the Trimble R10 supports signals from all existing and planned GNSS constellations and augmentation systems. With two integrated Trimble Maxwell™ 6 chips, the Trimble R10 offers 440 GNSS channels.

#### Trimble CenterPoint RTX

Trimble CenterPoint® RTX delivers RTK level precision anywhere in the world without the use of a local base station or VRS network.

Survey using satellite delivered, CenterPoint RTX corrections in areas where terrestrial based corrections are not available. When surveying over a great distance in a remote area, such as a pipeline or utility right of way, CenterPoint RTX eliminates the need to continuously move base stations or maintain connection to a cellular network.

#### Trimble xFill

Leveraging a worldwide network of Trimble GNSS reference stations and satellite datalinks, Trimble xFill® seamlessly fills in for gaps in your RTK or VRS connection stream. Maintain centimeter level accuracy beyond five minutes with a CenterPoint RTX subscription.

#### Smart, Versatile

A smart lithium-ion battery inside the Trimble R10 system delivers extended battery life and more reliable power. A built-in LED battery status indicator allows the user to quickly check remaining battery life.

The Trimble R10 system provides a number of communications options to support any workflow. Receive VRS corrections and connect to the Internet from the field with the integrated cellular modem. Using Wi-Fi, easily connect to the Trimble R10 system using a laptop or smartphone to configure the receiver without a Trimble controller.

#### The Complete Solution

Bring the power and speed of the Trimble R10 system together with trusted Trimble software solutions, including Trimble Access™ and Trimble Business Center.

Trimble Access field software provides specialized and customized workflows to make surveying tasks quicker and easier while enabling teams to communicate vital information between field and office in real time. Back in the office, users can seamlessly process data with Trimble Business Center software.

## Key Features

- ▶ Cutting-edge Trimble HD-GNSS processing engine
- ▶ Precise position capture and full tilt compensation with Trimble SurePoint technology
- ▶ Trimble CenterPoint RTX provides RTK level precision anywhere without the need for a base station or VRS network
- ▶ Trimble xFill technology provides centimeter-level positioning during connection outages
- ▶ Advanced satellite tracking with Trimble 360 receiver technology
- ▶ Sleek ergonomic design for easier handling



PERFORMANCE SPECIFICATIONS		
<b>MEASUREMENTS</b>		
	Measuring points sooner and faster with Trimble HD-GNSS technology	
	Increased measurement productivity and traceability with Trimble SurePoint electronic tilt compensation	
	Worldwide centimeter level positioning using Trimble CenterPoint RTX satellite delivered corrections	
	Reduced downtime due to loss of radio signal with Trimble xFill technology	
	Advanced Trimble Maxwell 6 Custom Survey GNSS chips with 440 channels	
	Future-proof your investment with Trimble 360 GNSS tracking	
	Satellite signals tracked simultaneously:	GPS: L1C/A, L1C, L2C, L2E, L5 GLONASS: L1C/A, L1P, L2C/A, L2P, L3 SBAS: L1C/A, L5 (For SBAS satellites that support L5) Galileo: E1, E5A, E5B, E5 AltBOC BeiDou: B1, B2
	CenterPoint RTX, OmniSTAR® HP, XP, G2, VBS positioning	
	QZSS, WAAS, EGNOS, GAGAN, MSAS	
	Positioning Rates	1 Hz, 2 Hz, 5 Hz, 10 Hz, and 20 Hz
POSITIONING PERFORMANCE <sup>1</sup>		
<b>CODE DIFFERENTIAL GNSS POSITIONING</b>		
	Horizontal	0.25 m + 1 ppm RMS
	Vertical	0.50 m + 1 ppm RMS
	SBAS differential positioning accuracy <sup>2</sup>	typically <5 m 3DRMS
<b>STATIC GNSS SURVEYING</b>		
High-Precision Static		
	Horizontal	3 mm + 0.1 ppm RMS
	Vertical	3.5 mm + 0.4 ppm RMS
<b>STATIC AND FAST STATIC</b>		
	Horizontal	3 mm + 0.5 ppm RMS
	Vertical	5 mm + 0.5 ppm RMS
<b>REAL TIME KINEMATIC SURVEYING</b>		
Single Baseline <30 km		
	Horizontal	8 mm + 1 ppm RMS
	Vertical	15 mm + 1 ppm RMS
Network RTK <sup>3</sup>		
	Horizontal	8 mm + 0.5 ppm RMS
	Vertical	15 mm + 0.5 ppm RMS
	RTK start-up time for specified precisions <sup>4</sup>	2 to 8 seconds
<b>TRIMBLE RTX™ TECHNOLOGY (SATELLITE AND CELLULAR/INTERNET (IP))</b>		
CenterPoint RTX <sup>5</sup>		
	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
<b>TRIMBLE XFILL<sup>6</sup></b>		
	Horizontal	RTK <sup>7</sup> + 10 mm/minute RMS
	Vertical	RTK <sup>7</sup> + 20 mm/minute RMS

# Trimble R10 GNSS SYSTEM

## 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, 3.57 kg (7.86 lb) items above plus range pole, controller & bracket	
Temperature <sup>8</sup>		
	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 5.1 W in RTK rover mode with internal radio <sup>9</sup>	
Operating times on internal battery <sup>10</sup>		
	450 MHz receive only option	5.5 hours
	450 MHz receive/transmit option (0.5 W)	4.5 hours
	450 MHz receive/transmit option (2.0 W)	3.7 hours
	Cellular receive option	5.0 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 <sup>11</sup>	
Cellular	Integrated, 3.5 G modem, HSDPA 7.2 Mbps (download), GPRS multi-slot class 12, EDGE multi-slot class 12, UMTS/HSDPA (WCDMA/FDD) 850/1900/2100MHz, Quad-band EGSM 850/900/1800/1900 MHz, GSM CSD, 3GPP LTE	
Bluetooth	Fully integrated, fully sealed 2.4 GHz communications port (Bluetooth®) <sup>12</sup>	
Wi-Fi	802.11 b,g, access point and client mode, WPA/WPA2/WEP64/WEP128 encryption	
USB v2.0	Supports data download and high speed communications	
External communication devices for corrections supported on	Serial, USB, TCP/IP and Bluetooth ports	
Data storage	4 GB internal memory; over seven years of raw observables (approx. 1.4 MB /day), based on recording every 15 seconds from an average of 14 satellites 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	

WEBUI		
	Offers simple configuration, operation, status, and data transfer	
	Accessible via Wi-Fi, Serial, USB, and Bluetooth	

SUPPORTED TRIMBLE CONTROLLERS		
	Trimble TSC7, Trimble T10, Trimble TSC3, Trimble Slate, Trimble CU, Trimble Tablet Rugged PC	

## CERTIFICATIONS

IEC 60950-1 (Electrical Safety); FCC OET Bulletin 65 (RF Exposure Safety); FCC Part 15.105 (Class B), Part 15.247, Part 90; PTCRB (AT&T); Bluetooth SIG; WFA IC ES-003 (Class B); Radio Equipment Directive 2014/53/EU, RoHS, WEEE; Australia & New Zealand RCM; Japan Radio and Telecom MIC

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- 1 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.
- 2 Depends on WAAS/EGNOS system performance.
- 3 Network RTK PPM values are referenced to the closest physical base station.
- 4 May be affected by atmospheric conditions, signal multipath, obstructions and satellite geometry. Initialization reliability is continuously monitored to ensure highest quality.
- 5 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.
- 6 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.
- 7 RTK refers to the last reported precision before the correction source was lost and xFill started.
- 8 Receiver will operate normally to -40° C, internal batteries are rated to -20° C.
- 9 Tracking GPS, GLONASS and SBAS satellites.
- 10 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.
- 11 Varies with terrain and operating conditions.
- 12 Bluetooth type approvals are country specific.

Specifications subject to change without notice.



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