

# TRIMBLE R10 GNSS SYSTEM

## KEY FEATURES

Cutting-edge **Trimble HD-GNSS** processing engine

Precise position capture 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 RTK coverage during connection outages

Advanced satellite tracking with **Trimble 360** receiver technology

Sleek ergonomic design for easier handling

## 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 like Trimble HD-GNSS, Trimble SurePoint™, Trimble CenterPoint™ RTX, and Trimble xFill™, 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 next generation of core positioning technology

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 Faster measurements, increased accuracy, and greater quality control with electronic bubble

With this system, surveyors don't have to switch focus from the controller screen to the pole bubble to check that the pole is plumb. The Trimble controller displays an electronic bubble.

## Full Tilt Compensation

The system constantly monitors pole tilt and compensates while the point is automatically or manually measured. If a point is measured with pole tilt beyond a user-defined setting, Trimble Access™ software will give an alert and prompt the surveyor to accept or discard the point. Trimble SurePoint even uses the pole tilt as a controlling input. After a point is measured, tilting the pole causes the system to automatically prepare to measure the next point.

## Data Traceability

As insurance that all of your data is traceable, the Trimble R10 can record the pole tilt information for measured points. These records include tilt and compass data for 100% data traceability.

## TRIMBLE 360 RECEIVER Future Proof Your Investment

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 an unparalleled 440 GNSS channels. Trimble delivers business confidence with a sound GNSS investment for today and long into the future.

## TRIMBLE CENTERPOINT RTX RTK Level Precision Anywhere

Trimble CenterPoint RTX delivers RTK level precision anywhere in the world without the use of a local base station or Trimble 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 station or maintain connection to cell coverage.

## TRIMBLE XFILL

### More continuous surveying, less downtime

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.

## ERGONOMICALLY DESIGNED

As the smallest and lightest integrated receiver in its class, the Trimble R10 is ergonomically designed to provide the surveyor with effortless handling and operation. Designed for ease of use, the progressive design incorporates a more stable center of mass at the top of the range pole, while its sleeker, taller profile provides the durability and reliability for which Trimble is known.

The Trimble R10 receiver incorporates a quick release adaptor for simple and safe removal of the receiver from the range pole. Additionally the quick release adaptor ensures a solid, stable connection between the range pole and receiver.

## AN INTELLIGENT SOLUTION

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.

## Advanced Communication Capabilities

The Trimble R10 system provides a number of communications options to support any workflow. The latest mobile phone technology is built in to receive VRS corrections and connect to the Internet from the field. Access Trimble Connected Community to send or receive documents while away from the office. Using WiFi, easily connect to the Trimble R10 system using a laptop or smartphone to configure the receiver without a Trimble controller.

## The Complete Solution: Trimble hardware and software

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.

The R10 GNSS system, a new era of surveying productivity beyond GNSS for professional surveyors.



# TRIMBLE R10 GNSS SYSTEM

## PERFORMANCE SPECIFICATIONS

### Measurements

- 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
  - BeiDou (COMPASS): B1, B2
- CenterPoint RTX, OmniSTAR HP, XP, G2, VBS positioning
- QZSS, WAAS, EGNOS, GAGAN
- Positioning Rates: 1 Hz, 2 Hz, 5 Hz, 10 Hz, and 20 Hz

## POSITIONING PERFORMANCE<sup>1</sup>

### Code differential GNSS positioning

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

### 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 <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
Trimble CenterPoint RTX	
Horizontal	4 cm
Vertical	9 cm
RTX convergence time for specified precisions <sup>12</sup>	
	30 minutes or less
RTX QuickStart convergence time for specified precisions <sup>12</sup>	
	5 minutes or less
Trimble xFill <sup>5</sup>	
Horizontal	RTK <sup>6</sup> + 10 mm/minute RMS
Vertical	RTK <sup>6</sup> + 20 mm/minute RMS

<sup>1</sup> 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.

<sup>2</sup> Depends on WAAS/EGNOS system performance.

<sup>3</sup> Network RTK PPM values are referenced to the closest physical base station.

<sup>4</sup> May be affected by atmospheric conditions, signal multipath, obstructions and satellite geometry. Initialization reliability is continuously monitored to ensure highest quality.

<sup>5</sup> Precisions are dependent on GNSS satellite availability. xFill positioning ends after 5 minutes of radio downtime. xFill is not available in all regions, check with your local sales representative for more information.

<sup>6</sup> RTK refers to the last reported precision before the correction source was lost and xFill started.

<sup>7</sup> Receiver will operate normally to -40° C, internal batteries are rated to -20° C.

<sup>8</sup> Tracking GPS, GLONASS and SBAS satellites.

<sup>9</sup> 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.

<sup>10</sup> Varies with terrain and operating conditions.

<sup>11</sup> Bluetooth type approvals are country specific.

<sup>12</sup> Receiver convergence time varies based on GNSS constellation health, level of multipath, and proximity to obstructions such as large trees and buildings. Convergences times decrease significantly when using a "RTX Quickstart" on a previously surveyed point or a known survey control point.

## HARDWARE

### Physical

Dimensions (WxH)	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>7</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>8</sup>
- Operating times on internal battery<sup>9</sup>:
  - 450 MHz and 900 MHz receive only option . . . . . 5.5 hours
  - 450 MHz and 900 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>10</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>11</sup>
- WiFi: 802.11 b/g, access point and client mode, WPA/WPA2/WEP64/WEP128 encryption
- External communication devices for corrections supported on – Serial, USB, Ethernet, and Bluetooth ports
- Data storage: 4 GB internal memory; over three 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 input and output
- 24 NMEA outputs, GSOE, RT17 and RT27 outputs

### WebUI

- Offers simple configuration, operation, status, and data transfer
- Accessible via WiFi, Serial, USB, and Bluetooth

### Supported Trimble Controllers

- Trimble TSC3, Trimble Slate, Trimble CU, Trimble Tablet Rugged PC

## CERTIFICATIONS

FCC Part 15 (Class B device), 22, 24; R&TTE CE Mark; C-Tick, A-Tick; PTCRB; WFA

Specifications subject to change without notice.



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