Trimble R9s

GNSS RECEIVER

Scalable GNSS Modularity
The Trimble® R9s receiver is a GNSS receiver designed to provide Survey professionals with maximum features and flexibility. The Trimble technologies provided in the Trimble R9s receiver are a unique and comprehensive combination.

Trimble CenterPoint® RTX, Trimble xFill® and Trimble 360 technologies are integrated into this receiver system to provide Surveyors with an outstanding option for their modular requirements.

Options and Upgrades
The Trimble R9s receiver platform allows you to purchase the options you want, when you want them. Whether you just need a simple receiver for post processing, a base receiver for transmitting RTK corrections, rover for mobile positioning, or a full base and rover capability, the Trimble R9s is scalable to meet your needs. You can also upgrade at anytime which means your technology investment can grow as your needs do.

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

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. In combination with a CenterPoint RTX subscription, survey level precisions are maintained beyond five minutes.

Trimble 360 Receiver
Powerful Trimble 360 receiver technology in the Trimble R9s receiver supports signals from all existing and planned GNSS constellations and augmentation systems. With two integrated Trimble Maxwell™ 6 chips, the Trimble R9s offers an unparalleled 440 GNSS channels. Trimble delivers business confidence with a sound GNSS investment for today and long into the future.

Smart for Many Applications
The Trimble R9s receiver’s compact form factor, low power consumption and powerful feature set make for an ideal combination supporting a wide range of high-accuracy positioning applications, including:
- RTK and RTX rover
- Mobile field base station
- Post Processed data collection

The familiar Trimble web user interface provides full receiver status, configuration, data access, as well as a variety of security levels and access controls.

For simple hands-on configuration, the Trimble R9s receiver offers a seven-button, two line display and status information so that performing in-field configuration is practically effortless. Best of all, no handhelds are required to get datalogging started.

The Trimble R9s is available with an internal radio or with no radio. The radio model includes an internal UHF radio for transmitting and receiving RTK corrections. The no radio model can use a high power external radio for transmitting RTK corrections.

The Trimble R9s integrated lithium-ion battery can provide up to 15 hours of continuous power, easily spanning one days work. With stringent environmental specifications, the Trimble R9s is fully rugged to IP67 for dust and water and meets MIL-STD-810F standards for shock, vibration, humidity and temperature, to keep working even in harsh conditions.
SATELLITE TRACKING
• Two advanced Trimble Maxwell 6 GNSS chipsets for a total of 440 channels
• Measure points sooner and faster with Trimble HD-GNSS technology
• Trimble EVEREST™ multipath signal rejection
• Trimble 360 receiver technology
• Very low noise GNSS carrier phase measurements with <1 mm precision in a 1 Hz bandwidth
• Signal-to-noise ratios reported in dB-Hz
• Proven Trimble low elevation tracking technology
• Satellite signals tracked simultaneously:
  - GPS: L1 C/A, L2C, L2E, L5
  - Galileo: E1, E5a, E5b, E5aB/OC
  - BeiDou: B1, B2
  - CenterPoint RTX
• QZSS, WAAS, EGNOS, GAGAN, MSAS
• Positioning Rates: 1 Hz, 2 Hz, 5 Hz, 10 Hz, and 20 Hz

POSITIONING PERFORMANCE¹
• Code Differential GNSS Positioning
  - Horizontal: 0.25 m + 1 ppm RMS
  - Vertical: 0.50 m + 1 ppm RMS
• SBAS differential positioning accuracy² typically <5 in 3DRMS

STATIC GNSS SURVEYING
• High Accuracy Static
  - Horizontal: 3 mm + 0.1 ppm RMS
  - Vertical: 3.5 mm + 0.4 ppm RMS
• Static and Fast Fail Survey
  - Horizontal: 3 mm + 0.5 ppm RMS
  - Vertical: 5 mm + 0.5 ppm RMS

RTC CONVERGENCE TIME
• Single Baseline <30 km
  - Horizontal: 8 mm + 1 ppm RMS
  - Vertical: 15 mm + 1 ppm RMS
• Network RTK²
  - Horizontal: 8 mm + 0.5 ppm RMS
  - Vertical: 15 mm + 0.5 ppm RMS
• RTK start-up time for specified precisions³,⁴: 2 to 8 seconds

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

CenterPoint RTX
• Horizontal: 2 cm RMS
• Vertical: 5 cm RMS
• RTX convergence time for specified precisions: Worldwide: <15 minutes
  - RTX QuickStart convergence time for specified precisions: <1 minute
• RTX convergence time for specified precisions in select regions (Trimble RTX Fast Regions): 1 minute

Trimble xFill³
• Horizontal: RTK + 10 mm/minute RMS
• Vertical: RTK + 20 mm/minute RMS

HARDWARE
Physical
• Keyboard and display: Vacuum fluorescent display 16 characters by 2 rows.
• Dimensions (L x W x D): 24 cm x 12 cm x 5 cm
• Weight: 1.65 kg receiver with internal battery and radio

ENVIRONMENTAL
• Operating: −40°C to +65°C
• Storage: −40°C to +80°C
• Humidity: MIL-STD 810F, Method 507.4
• Waterproof: IP67 for submersion to depth of 1 m, dustproof

ELECTRICAL
• Internal: 12 VDC
• Power input on 7-pin D-shell Lemo connector is optimized for lead acid batteries with a cut-off threshold of 11.5 V
• Power consumption: 8.0 W in base mode with internal transmit radio

Operation Time on Internal Battery
• Rover: 13 hours; varies with temperature

Base station
• 450 MHz systems: Approximately 11 hours; varies with temperature

INPUT/OUTPUT FORMATS
• Correction Formats:
  - CMR, CMR+, CMRx, RTCM 2.1, RTCM 2.2, RTCM 2.3, RTCM 3.0, RTCM 3.1, RTCM 3.2
• Observables:
  - RT17, RT27, RTCM 3.x, BINEX
  - Position/Status I/O:
  - NMEA-0183 v2.30, GSOF
• 1 PPS output

COMMUNICATION AND DATA STORAGE
• Lemo (Serial): 7-pin 05 Lemo, Serial 1, 3 wire RS-232
  - 26-pin D-sub Serial 2, Full 9 wire RS-232, using adapter cable
• Modem (Serial): 26-pin D-sub Serial 3, 3 wire RS-232, using adapter cable
  - Ethernet:
  - A multi-port adapter for Bluetooth wireless technology⁴
  - Fully-integrated, fully-sealed 2.4 GHz Bluetooth module
  - Integrated radios (optional):
    - internal 450 MHz (UHF) Tx/Rx
  - External GSM/GPRS, cell phone support
  - For Internet-based correction streams
  - Receive position update rate:
    - 1 Hz, 2 Hz, 5 Hz, 10 Hz, 20 Hz positioning capacity:
    - 52 MB

CERTIFICATIONS
IEC 60950-1 (Electrical Safety): FCC OET Bulletin 05 (RF Exposure Safety); FCC Part 15.105 (Class B); Part 15.247, Part 50; PTCRB (AT&T); Bluetooth SIG; IC ES-003 (Class B); Radio Equipment Directive 2014/53/EU, RoHS, WEEE; Australia & New Zealand RCM; Japan Radio and Telecom MIC

NTHERAMERICA
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Contact your local Trimble Authorized Distribution Partner for more information.

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, EML and multipath clear 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 may require precise athermometers and occupations up to 24 hours may be required to achieve the high accuracy specific statics.

2. Dependent on WAAS/EGNOS system performance.

3. 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 geographical location and atmospheric activity, scintillation levels, GNSS constellation health and availability and level of multipath including obstructions such as large trees and buildings.

4. Accuracy is dependent on GNSS satellite availability. xFill positioning without a Trimble CenterPoint RTX subscriber ends after 5 minutes of radio silence. xFill positioning with a CenterPoint RTX subscriber 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 to Trimble RTX Fast regions. xFill is not available in all regions, check with your local sales representative for more information.

5. Rectification to the last reported pseudorange before the correction source was lost and xFill started.

6. The internal battery will operate from −20°C to +55°C. The internal battery charger will operate from 0°C to +40°C. All temperatures listed are ambient.

7. Bluetooth type approvals are country specific. Contact your Trimble distribution partner for more information.

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