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 what, 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.

Key Features
- Advanced satellite tracking with Trimble 360 receiver technology
- Cutting-edge Trimble HD-GNSS processing engine
- Convenient front panel display and configuration
- Bluetooth®, Ethernet, serial and USB support
- Data logging internally and to external drive
- Multiple data file formats
- Trimble CenterPoint RTX provides RTK level precision anywhere without the need for a base station or VRS network
- Trimble xFill technology provides seamless RTK coverage during connection outages
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: E1a, E1b, E5a, E5b, E6, E5a/Boc
  – BeiDou: B1, B2, B3
  – CenterPoint RTX
  – QZSS, WAAS, EGNOS, GAGAN, MSAS
• Positioning Rates: 1 Hz, 2 Hz, 5 Hz, 10 Hz, and 20 Hz

POSITIONING PERFORMANCE
Code Differential GNSS Positioning

<table>
<thead>
<tr>
<th></th>
<th>Horizontal</th>
<th>Vertical</th>
</tr>
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<tbody>
<tr>
<td>1P55 (3DMS)</td>
<td>0.25 m + 1 ppm RMS</td>
<td>0.50 m + 1 ppm RMS</td>
</tr>
<tr>
<td>SBAS differential positioning accuracy</td>
<td>typically &lt;5 m 3DMS</td>
<td></td>
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Static GNSS surveying

<table>
<thead>
<tr>
<th></th>
<th>Horizontal</th>
<th>Vertical</th>
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<tbody>
<tr>
<td>High Accuracy Static</td>
<td>3 mm + 0.1 ppm RMS</td>
<td>3.5 mm + 0.4 ppm RMS</td>
</tr>
<tr>
<td>Horizontal</td>
<td>3 mm + 0.5 ppm RMS</td>
<td>5 mm + 0.5 ppm RMS</td>
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Real Time Kinematic surveying

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<thead>
<tr>
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<th>Horizontal</th>
<th>Vertical</th>
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<tbody>
<tr>
<td>Single Baseline &lt;30 km</td>
<td>8 mm + 1 ppm RMS</td>
<td>15 mm + 1 ppm RMS</td>
</tr>
<tr>
<td>Network RTK</td>
<td>8 mm + 0.5 ppm RMS</td>
<td>15 mm + 0.5 ppm RMS</td>
</tr>
<tr>
<td>RTK start-up time for specified precisions</td>
<td>2 to 8 seconds</td>
<td></td>
</tr>
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TRIMBLE RTX™ TECHNOLOGY

<table>
<thead>
<tr>
<th></th>
<th>Horizontal</th>
<th>Vertical</th>
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<tbody>
<tr>
<td>CenterPoint RTX</td>
<td>2 cm RMS</td>
<td>5 cm RMS</td>
</tr>
<tr>
<td>RTX convergence time for specified precisions - Worldwide</td>
<td>&lt; 15 min</td>
<td></td>
</tr>
<tr>
<td>RTX convergence time for specified precisions in select regions (Trimble RTX Fast Regions)</td>
<td>&lt; 1 min</td>
<td></td>
</tr>
<tr>
<td>Trimble xFill</td>
<td>10 mm/minute RMS</td>
<td>20 mm/minute RMS</td>
</tr>
</tbody>
</table>

1 Precision and reliability may be subject to anomalies due to multipath, obstructions, satellite geometry, and atmospheric conditions. These specifications stated recommend the use of stable mounts in an open sky view, EM 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 accuracy static specification.

2 CenterPoint RTX PPM values are referenced to the closest physical base station.

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 typically 5-10 minutes.

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, vehicle mounting orientation, vehicle speed, vehicle stability, 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 and after 5 minutes of radio downtime. xFill positioning with a CenterPoint RTX 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 The internal battery will operate from –10°C to +55°C. The internal battery charger will operate from 0°C to +70°C. Power input on 7-pin D-shell Lemo connector is optimized for lead acid batteries with a cut-off threshold of 11.5 V

9 Power input on the 26-pin D-sub connector is optimized for Trimble Lithium-ion battery input with a cut-off threshold of 10.5 V

10 Power consumption: 6.0 W in rover mode with internal receiver radio.

11 Power consumption: 8.0 W in base mode with internal transmit radio

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

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

INTEGRITY

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<thead>
<tr>
<th></th>
<th>Horizontal</th>
<th>Vertical</th>
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<tbody>
<tr>
<td>Base station</td>
<td>0.25 m (0.82 ft)</td>
<td>0.50 m (1.64 ft)</td>
</tr>
<tr>
<td>External</td>
<td>0.25 m (0.82 ft)</td>
<td>0.50 m (1.64 ft)</td>
</tr>
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