

# SOKKIA™



Sokkia's GSR2200 systems provide a complete "GPS toolbox" for doing real-time kinematic, static, kinematic and rapid static surveys, depending on project requirements.

The GSR2200 provides high-precision GPS measurement, complete with real-time kinematic positioning and on-the-fly initialization. The GSR2200 Sensor is a smaller, lighter version of the standard GSR2200, making it ideal for mobile/backpack applications.

## Real-Time

Sokkia's GSR2200 (Global Surveying Receiver) provides the ultimate combination of performance and technology for surveying and mapping applications. With its built-in real-time capability, the GSR2200 can be used as part of a real-time, on-the-fly system to achieve centimeter-level accuracies. Another Sokkia GSR2200 GPS Receiver used as a base station and a radio data link complete the basic field package.

## Anti-Spoofing Mitigation

You can simultaneously achieve increased tracking ability under adverse conditions and high accuracy with Sokkia's GSR2200. Patented Z-Technology within the GSR2200 provides real, breakthrough performance by allowing uninterrupted use—even when Anti-Spoofing (AS) is turned on. The GSR2200 automatically activates its Z-Tracking™ mode to mitigate AS when AS is turned on, resulting in high accuracy with short occupation times.

# GSR2200

## GSR2200 SENSOR

### REAL-TIME, DUAL-FREQUENCY GPS RECEIVERS

## On-the-Fly Initialization

The GSR2200 provides centimeter-level accuracy on-the-fly for optimum efficiency in topographic surveying and other applications. The system conveniently improves your productivity by gaining initialization while you're moving; this allows you to collect grid or feature data by simply walking or driving the area while the system collects points.

## Surveying Performance

The GSR2200's dual-frequency reception eliminates the effects of ionospheric interference, which allows for accurate measurement of medium- to long-range baselines. In rapid static surveys, centimeter accuracies on one-mile baselines using one-minute occupation times have been achieved with the GSR2200 in Z-Tracking mode.

Dual-line digital processing capability substantially enhances jam immunity over other single-bit receivers and allows effective tracking of satellites at low elevations\*.

The GSR2200 reduces the possibility of losing lock around transmitters or high-voltage power lines, so you stay productive in those areas.

\* The recommended 10° elevation mask means more satellite availability and lower PDOP.



## GSR2200 Real-Time System Highlights

The GSR2200 offers real-time capability that increases your productivity and makes your job easier. Combine a GSR2200 Rover, a GSR2200 Base Station, a Husky FS/2™ data collector with GPS Topo software, and radios to build a real-time system that offers features like:

- Choose from common coordinate systems, or calibrate the system to your local coordinate system.
- Choose from flexible data collection options:
  - Collect point features—control points such as traverse points and boundary corners—and accurately map features such as manholes and utility poles.
  - Collect continuous contour data as fast as you can walk or drive the area.
  - Collect linework to accurately map curbs, centerlines, sewer lines, etc.
  - Collect continuous stream data for fast mapping of linear features.
- The GSR2200 system provides azimuth and distance directions to design points, in addition to a graphical "bulls-eye" for quick and accurate stake-out applications.
- Automate mapping through the user definable feature code library and point descriptions.

## GSR2200 Applications



Configure the standard GSR2200 for numerous applications:

- The Rover system uses the Husky FS/2 data collector as an interface to the receiver for inputting feature codes.
- Application specific software is available for GPS topographic, seismic and mine surveying.

## GSR2200 Sensor: Mobile/Backpack Version

Sokkia's GSR2200 real-time, dual-frequency GPS receiver is also available in a smaller, lighter format, making it ideal for mobile/backpacking applications. In addition to the GSR2200's proven high-precision GPS measurement, real-time kinematic positioning and on-the-fly initialization, the sensor has been upgraded to give 5Hz position updates with 100ms latency. Positions are calculated independently, with no extrapolation. The GSR2200 Sensor provides independent positions quickly, so you get positional information faster and more reliably—making the system ideal for stake-out applications.



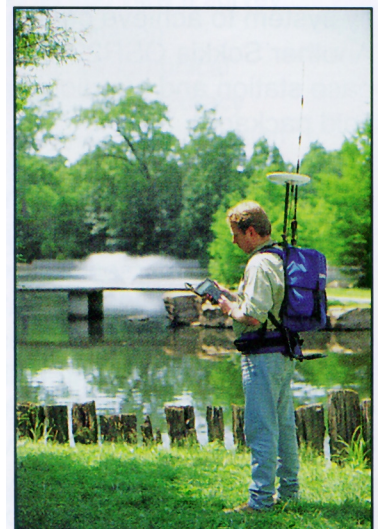
The Sensor does not have a keypad or display, so it is approximately 20% smaller and lighter-weight than the standard GSR2200. It's flexible; use the Sensor system only for its real-time and static survey capabilities, or add additional controller software for the same functionality as the standard system.

## GSR2200 Sensor Performance

The GSR2200 Sensor provides the fastest available initialization time, typically less than 120 seconds. Once initialized, you can survey with real-time centimeter-level accuracy.

## GSR2200 Sensor Applications

The GSR2200 Sensor is designed for real-time applications requiring high accuracy, high update rates and low latency—such as topographic mapping, mining and seismic surveying applications.



# GSR2200 and GSR2200 Sensor Specifications

## Real-Time Accuracy

Real-time capability combines all the GPS observables (C/A code & carrier, P(L1) code & carrier, P(L2) code & carrier) to derive (in real-time) the best possible position data:

- Point positioning (rms)      horizontal 1 cm, vertical 1.7 cm
- Point occupation time      2 seconds (typical), sub-centimeter accuracy with longer occupation time
- While moving (rms)      horizontal 3 cm, vertical 5 cm
- Azimuth(arc sec.)      0.15 +1.5/baseline length in kilometers
- Static/Rapid Static      horizontal 5mm + 1 ppm

## Position Update Rate\*\*

User-selectable from 5Hz

## Position Latency\*\*

Position latency is the difference between the time of measurement and the time that the position is output from the serial port. Typical position latency is 0.1 sec. Actual position latency for each epoch is output as a message on the serial port.

## GSR2200 Receiver

Temperature Ranges

Operating      -4° to +131°F (-20° to +55°C)

Storage      -22° to +167°F (-30° to +75°C)

Waterproof      to 5 psi\* (GSR2200 Sensor meets MIL-STD 810D to withstand wind-driven rain and dust; also meets MIL-STD 810E for resistance to vibration\*\*)

Weight      8.0 lbs (3.6 kg)  
Sensor: 5.9 lbs. (2.7kg)

\* applies only to standard GSR2200

\*\* applies only to GSR2200 Sensor

Design and specifications are subject to change without notice.

## Standard Features

- Real-time kinematic position with on-the-fly initialization
- "All-in-View" operation for all GPS signals: 12 channels C/A, 12 channels P(L1), 12 channels P(L2)
- Real-time raw measurement data outputs
- Automatic switching to Z-Tracking when AS is activated
- Full wavelength carrier on L1 and L2
- 12 watt power consumption typical
- Audible alarm for low power
- 2 RS-232 ports\*—115,200 bps max.; (GSR2200 Sensor has 3 RS-232 ports\*\*—115,200 bps max.)
- 8-line by 40-character display\*
- Waypoint navigation
- Cold start: 2 minutes to first data
- Warm start: <30 seconds to first data

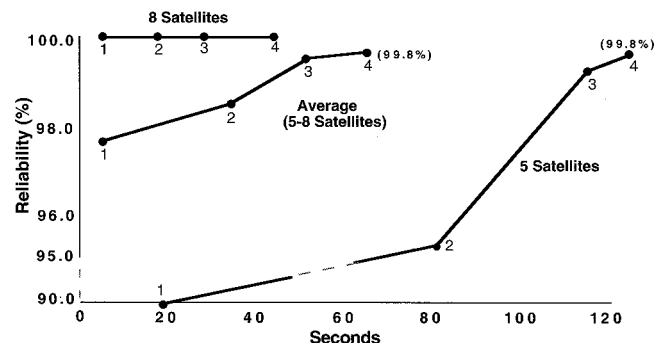
## Optional Features

- 1 PPS timing signal
- External frequency input\*
- Photogrammetry input\*
- Real-time differential GPS (RTCM base & remote)
- 2 additional RS-232 ports\*
- Expanded internal memory (1, 3, 6 or 10Mb)
- Event marker input\*\*

## Carrier Phase Initialization

Once satellites have been acquired, the time taken to initialize the carrier phase (by resolving ambiguities) depends on a user-selectable setting that allows you to choose high initialization speed or high reliability.

The graph below indicates user-selectable settings for speed and reliability, from mode 1 (fastest) through mode 4 (most reliable). Results are based on 12,000 tests of 0.1, 2, 4, 7, and 9km baselines.



## GSR2200 and GSR2200 Sensor Specifications

Sokkia's GSPRO-2000 is a state-of-the-art suite of software that provides friendly processing support to surveying professionals involved with the acquisition, analysis and management of data collected with GPS receivers. All modules except Database are included in GSPRO-2000; modules are also available separately.

### GSPRO-2000

- Highly sophisticated, multi-level graphical interface
- Control the complete processing of the GPS survey
- Icon-labeled modules enable you to plan efficient GPS surveys, organize the acquisition of GPS data, transfer the GPS receiver data into a computer, process and analyze measurements, perform a network adjustment, produce CAD drawings, and report and archive final results
- Includes the following modules:

#### *Mission Planning*

- Determines the best time periods for data collection
- Determines sufficient satellite availability and geometry between obstructed sites
- Print tables and plots to aid in site reconnaissance and to evaluate the effect of on-site obstructions
- Automatically determines multi-site visibility and the effects of multi-site obstructions

#### *Transfer*

- Fast data transfer (up to 115,200 baud)
- Verify and edit field data
- Increase memory storage and reliability by logging data directly to a PC
- Access and operate a receiver at a remote site
- Prepare and load waypoints to the receiver

#### *File Tools*

- Examine data quality and perform editing functions such as combining raw data files
- Transform data between published or custom datums and map projections
- Read or create RINEX files for use with GSPRO-2000 or other software systems
- Use the BLUE BOOK utility to output files in the standard NGS Blue Book format

### *Processing*

- Achieve sub-centimeter accuracy with the GSPRO-2000 processor, combined with data from GSR2000-Series receivers
- Batch process data easily and efficiently with the "Automatic" processing mode
- Increase control and flexibility with the "Manual" processing mode; graphical flowchart makes it easy
- Process static, kinematic, rapid static and pseudo-kinematic data quickly and accurately
- Triple-differencing, double-differencing, pseudo-range processing and float and fixed solutions are used to provide the best possible accuracy
- Reliability figures are computed
- Analyze data quality in graphical and tabular form

### *CAD*

- Complete, convenient, built-in CAD functionality; also compatible with AutoCAD<sup>®</sup> and other CAD systems
- Complete plotting capabilities for plotting data to a plotter, printer, file or computer screen
- No other software package is necessary because valuable design tools such as Contour, Volume, Mapping, Coordinate Geometry and 3-D View are available to generate complete designs

### *Network Adjustment*

- Manage and edit baselines from multiple projects
- Choose to fix, free or weight points as desired
- Selectively adjust baselines or complete networks using the 3-dimensional least squares adjustment
- View comprehensive adjustment results

### *Optional Module: Database*

- Store position and attribute information of existing survey stations
- Import and archive control files
- Interactive graphics features let you view a survey network and obtain planning information
- Select control stations based on geographical locations or station attributes such as accuracy
- Generate a report containing all stored information about the stations of interest

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