

4000 MSK DGPS Reference Station

Differential GPS with MSK Modulator

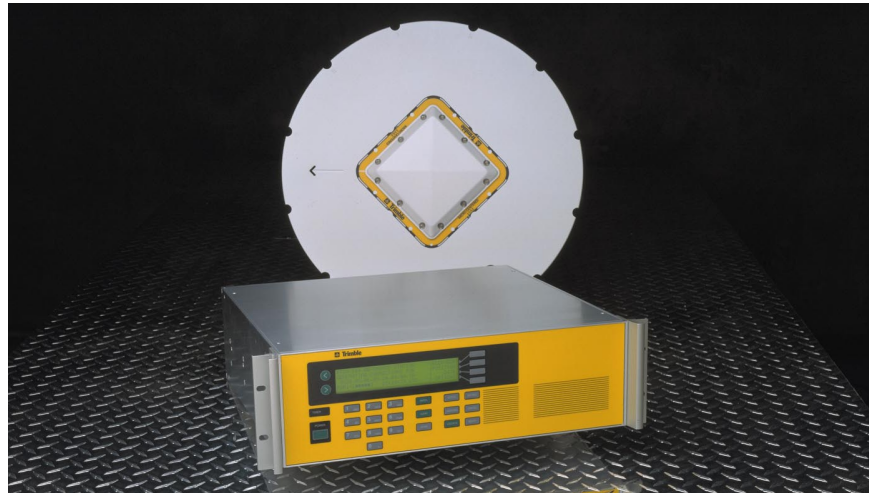
Key features and benefits

- **RTCM RSIM compliant**
- **L1 or L1/L2 versions**
- **Single- or Dual-carrier modulator versions**
- **Super-trak signal processing technology**
- **Improved performance in poor RF conditions**
- **EVEREST Multipath Rejection technology**
- **Fully upgradeable**

The 4000MSK DGPS™ Reference Station receiver combines Trimble's latest GPS receiver and marine band Minimum Shift Keying (MSK) modulator technologies into one unit. Designed specifically for use in marine radiobeacon DGPS systems, the 4000MSK DGPS Reference Station, combined with the 4000IM MSK™ Integrity Monitor and the Beacon Control System Software (BCS), provides the most straightforward means of establishing a differential GPS service utilizing either existing or new radiobeacon sites.

The 4000MSK DGPS Reference Station's GPS engine, based on Trimble's industry leading Series 4000 SSi receiver, incorporates Trimble's Super-trak™ technology for superior signal acquisition, superior signal tracking, and increased immunity to jamming due to radio frequency interference. The GPS engine also includes patented EVEREST™ Multipath Rejection technologies for rejection of reflected GPS signals before they can affect measurements and positions. The result is low-noise C/A code measurements that are used to generate precise RTCM SC-104 standard DGPS corrections useable for real-time, sub-meter navigation and positioning.

The integral MSK modulator operates in the 283.5 to 325.0 kHz marine radiobeacon band and



The integrated solution for marine radiobeacon DGPS systems.

complies with International Association of Lighthouse Authorities (IALA) bandwidth requirements. The dual-carrier modulator option provides both a DGPS data modulated MSK signal and a CW RF signal.

The use of radiobeacons to broadcast differential GPS corrections is recognized as being both efficient and cost effective. A radiobeacon DGPS system that utilizes the 4000MSK DGPS Reference Station can provide both DGPS correction data to the general navigation and positioning user community and L1 (L2 optional) geodetic survey grade GPS data in support of survey operations. Remote control of the receiver is available through the serial ports with RTCM RSIM commands for greater system configuration flexibility.

The 4000MSK DGPS Reference Station offers the utmost in convenience and reliability. The unit is housed in a rugged, aluminum rackmount chassis with both universal AC and DC power inputs and four RS-232/422 serial ports for receiver control and data archiving. With Flash EPROM technology, the unit can be upgraded to maintain compliance to standards with a simple firmware change.

The IALA, DGPS service providers worldwide and the Radio Technical Commission for Maritime Services (RTCM) continue to refine international standards for DGPS broadcasts. Trimble works closely with these groups and others to ensure adherence to existing and future standards, as well as provide the latest in technological innovation.

Trimble

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STANDARD FEATURES

- Full RTCM, RSIM, and IALA compatibility
- Autonomous operation – automatic resumption after power restoration
- Firmware upgrades via serial port
- Four RS-232/RS-422 ports, user selectable
- Dual operating mode – simultaneous RTCM output and GPS survey data generation
- Geodetic quality antenna with 30 m cable
- Remote control command set
- External frequency input
- AC and DC power inputs with auto changeover
- One-year warranty

OPTIONS

- Choke Ring Geodetic GPS Antenna
- Dual Frequency, GPS code and carrier
- Additional 30 m antenna cable with in-line amplifier
- RTK/OTF Reference station

PHYSICAL CHARACTERISTICS

Rack-mount unit

Size	427 mm W x 406 mm D x 134 mm H (16.8" W x 16" D x 5.25" H)
Weight	6.8 kg (15 lbs.)
Power	AC: 100, 120, 220, 240 Volts; 40 Watts DC: 10–36 Volts; 30 Watts
Operating temperature	0°C to +50°C
Storage temperature	-20°C to +60°C
Humidity	95% RH non-condensing

Geodetic antenna

Size	406 mm D x 89 mm H (16" D x 3.5" H)
Weight	2.6 kg (5.7 lbs.)
Operating temperature	-40°C to +65°C
Storage temperature	-55°C to +75°C
Humidity	100% RH – fully sealed

DGPS REFERENCE STATION SPECIFICATIONS

Signal Processing	Multibit Super-trak; Maxwell chip architecture with EVEREST Multipath Rejection technology; very low noise C/A code processing
Tracking (Std)	12 channels L1 C/A code and carrier
(Opt)	12 channels L1+12 channels L2 code and carrier
Startup time	<2 minutes after cold start
RTCM message output	Types 1, 2, 3, 5, 6, 7, 9, 16, 18, 19
Display	Backlit LCD with four lines of 40 alphanumeric characters; Large, easy-to-read characters – 2.8 mm x 4.9 mm; Total viewing area 32 cm ² ; Adjustable backlight and viewing angle
Keyboard	Alphanumeric, function and softkey entry
Data recording	RTCM corrections, RSIM messages and all data available via serial port
Remote control	Full RSIM and TNL Data Collector Interface

MSK MODULATOR SPECIFICATIONS

Frequency Range	283.5–325.0 kHz
Frequency Resolution	100 Hz
Frequency Accuracy	± 4 ppm over temperature range
Output Amplitude	1.7 V p-p 50 Ohms
RF Bit Rate	25, 50, 100, 200 bits/second
Modulation	MSK
Output Connector	BNC

ORDERING INFORMATION

4000MSK DGPS Reference Station L1/Single	Part Number 26541-00
GPS L1 only, single MSK carrier modulator	
4000MSK DGPS Reference Station L1/Dual	Part Number 26541-02
GPS L1 only, MSK and CW carrier modulator	
4000MSK DGPS Reference Station L1/L2/Single	Part Number 26541-10
GPS L1/L2, single MSK carrier modulator	
4000MSK DGPS Reference Station L1/L2/Dual	Part Number 26541-12
GPS L1/L2, MSK and CW carrier modulator	

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