The Trimble® DSM™ 232 DGPS receiver is an ideal solution for dynamic real-time marine positioning operations such as harbor dredging and for commercial positioning applications where it is integrated as the positioning sensor component. The modular GPS receiver with antenna options accepts GPS corrections from a variety of sources allowing the user the choice of sub-meter to centimeter performance.

The DSM 232 receiver is a high-quality solution for applications that require sub-meter, decimeter or centimeter positioning in demanding environments.

The DSM 232 receiver offers a wide range of GPS positioning methods and associated accuracies for offshore and onshore marine construction applications.

- Satellite Based Augmentation Systems (SBAS) such as WAAS, EGNOS and MSAS
- IALA compliant Navigation Beacon
- OmniSTAR VBS service¹
- RTCM from a site based DGPS Reference Station
- OmniSTAR XP/HP¹
- Real Time Kinematic (RTK) for maximum precision

This breakthrough GPS technology gives the operator the flexibility to purchase an upgradeable or non upgradeable receiver. The non upgradeable receiver can be purchased to accommodate current strict budget needs, or in cases of a more flexible budget, purchase the upgradeable receiver in anticipation of growth in future projects.

The entry level DSM 232 includes a combined GPS / Beacon antenna capable of sub-meter performance using the free public IALA Beacon and SBAS corrections or subscription-based OmniSTAR VBS corrections. The beacon receiver provides superior weak-signal performance, allowing differential corrections to be received at long distances from the reference station and during challenging weather conditions.

With the addition of a dual frequency antenna and firmware upgrade the upgradeable DSM 232 models can use the OmniSTAR XP/HP satellite correction services. In this mode, performance is enhanced to decimeter accuracy in all 3 dimensions, over a large geographic (land based) region. With OmniSTAR XP service, there is no degradation in position accuracy as generally associated with increasing distance from a fixed reference station.

The DSM 232 can be ordered with additional firmware to add premium RTK performance for high precision construction tasks. The DSM 232 can be used in an RTK rover mode through the use of an external radio link. Again, the upgradeable DSM 232 model can also be upgraded to include this RTK functionality.

The modularity of the DSM 232 system delivers installation flexibility via external GPS antenna options, as required on marine vessel installations, such as on top of a mast. The receiver can then be mounted in a secure environment protected from the weather and theft, leaving only the antenna outside in a protected and optimal location. In all cases the receivers EVEREST™ technology improves results in high multi-path environments such as those encountered on inland waterways and harbor construction sites.

SUPERIOR INTEGRATION
The DSM 232 receiver is designed for easy integration into onboard systems. The built-in display and keyboard offers fast configuration and status information. The position, velocity, correction status and time is available from the data ports in NMEA 0183 or NMEA 2000®. The DSM 232 receiver outputs position reports data at rates up to 10 Hz. The 3 serial ports can also be used for setup, control, and data output using Trimble Standard Interface Protocol (TSIP) providing compatibility with with previous DSM receiver model installations.

DGPS REFERENCE STATION
In regions where the free-to-air correction services such as IALA Beacon or SBAS services are not available the DSM 232 RS DGPS Reference Station is available. In this case an external radio such as the Trimble TRIMMARK3 radio can be used to deliver the high quality RTCM SC-104 format corrections to rover units.

¹OmniSTAR VBS/XP/HP services require a subscription from the service provider so check with them for availability and operating constraints in your area.
### HARDWARE SPECIFICATIONS

**Physical**
- Size (WxHxD): 14.8 cm (5.7 in) x 5.6 cm (2.2 in) x 21.6 cm (8.6 in)
- Receiver Weight: 0.96 kg (2.13 lb)
- Keyboard and display: 4 button keypad
- Antenna Mounting: All accept 5/8”-11 UNC male bolt

**Environmental**
- Operating temperature: -30°C to +65°C (-22°F to +149°F)
- Storage temperature: -40°C to ++85°C (-40°F to +185°F)
- Humidity: Complies with MIL 810E. Unit sealed to +/- 5 PSID

**Electrical**
- Power: 9V to 28V DC external power input
- Power consumption: Nominal 350 mA at 12 V DC

**Communications**
- Two CONXALL connectors on the back plane, Port A and B
- 3 programmable RS-232 outputs
- 2 CAN (NMEA 2000®) outputs
- Receiver position update rate: 1.2, 5, 10 Hz
- Correction Data Input and Output: .CMR II, .CMR+, RTCM 2.1, RTCM 2.3, RTCM 3.0
- NMEA – GGA, GLL, GRS, GSA, GST, GSV, MSS, RMC, VTG, ZDA, various Proprietary NMEA TSP format

### ANTENNA SPECIFICATIONS

**DGPS Antenna**
- Size: 15.5 cm (6.1 in) x 14.0 cm (5.5 in)
- Weight: 0.55 Kg (1.2 lb)
- Operating Temperature: -30°C to +65°C
- Usage: L1 GPS, Beacon, SBAS and L-Band

**Dual Frequency Antenna**
- Size: 16 cm (6.25 in) x 7.5 cm (3 in)
- Weight: 0.55 Kg (1.2 lb)
- Operating Temperature: -30°C to +65°C
- Usage: L1/L2 GPS, SBAS and L-Band

**Geodetic Reference Station Antenna**
- Size: 34.3 cm (13.5 in) x 7.6 cm (3 in)
- Weight: 1.31 Kg (2.88 lb)
- Operating Temperature: -40°C to +70°C
- Usage: L1/L2 GPS and SBAS

### PERFORMANCE SPECIFICATIONS

**Measurements**
- Trimble EVEREST multi-path mitigation technology
- DGPS: 12 Channel L1 plus 2 channels for Beacon
- DGPS with SBAS (WAAS / EGNOS / MSAS): 11 GPS channels plus 1 for SBAS
- RTK or OmniSTAR VBS/XHP: 24 channel L1/L2 plus 1 channel L Band

**Code differential GPS positioning**
- Horizontal accuracy: ±(0.25m + 1 ppm) RMS ±(0.8 ft + 1 ppm)
- Vertical accuracy: ±(0.50m + 1 ppm) RMS ±(1.6 ft + 1 ppm)

**WAAS / EGNOS / MSAS**
- Horizontal accuracy: Typically 1m (3 ft)
- Vertical accuracy: Typically <5m (<16 ft)

**OmniSTAR Positioning**
- Horizontally typically better than 1 m (3 ft)
- XP Service Accuracy: .Horizontal 10cm (.3 ft), Vertical 20cm (.7 ft)
- HP Service Accuracy: .Horizontal 5cm (.2 ft), Vertical 10cm (.3 ft)

**Real Time Kinematic (RTK) positioning**
- Horizontal accuracy: ±(10mm + 1 ppm), ±(0.3 ft +1ppm)
- Vertical accuracy: ±(20mm + 1 ppm), ±(0.7 ft +1ppm)

**Initialization time**
- Regular RTK operation with base station...Single/Multi-base minimum: 10 sec + 0.5 times baseline length in km, <30 km
- Initialization reliability: Typically >99.9%

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1. Depends on WAAS / EGNOS / MSAS system performance
2. Accuracy and reliability may be subject to anomalies such as multipath, obstructions, satellite geometry and atmospheric conditions. Always follow recommended practices.
3. May be affected by atmospheric conditions, signal multipath and satellite geometry. Initialization reliability is continuously monitored to ensure highest quality.

Specifications subject to change without notice.

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