



True North Technologies *Revolution™* TNT1600GS Gyro Stabilized Electronic Compass

If your compass application involves vibration, acceleration, uneven terrain, or rough seas, you will find the True North Revolution™ TNT1600GS to be an uncompromising solution that will outperform rival units costing considerably more. The GS provides remarkably accurate heading, pitch, and roll in dynamic conditions. It all starts with a precision 3-axis solid-state magnetometer. Two angular rate gyros independently stabilize pitch and roll. They augment a dual-axis, electrolytic tilt sensor that provides precise tilt measurements in static environments. Two sets of independent filters, one set for pitch and one for roll, combine gyro and electrolytic sensor measurements to provide the best available tilt measurements.

The recommended applications for the GS are manned and unmanned vehicles, robotics, weather buoys, antenna positioning, platform stabilization, marine navigation, excavation machinery, and irrigation equipment.

The exceptional performance of the GS is achieved by first calibrating all sensors over a wide temperature range.



Then True North aligns the magnetic, tilt, and rate sensors to a common set of axes using precision calibration equipment capable of measuring angles as small as 0.001°. This alignment procedure, driven by our proprietary calibration routines, minimizes axis coupling and corrects for gyro drift errors.

The Revolution GS is compatible with True North's entire family of Revolution compasses. The GS board fits in the same enclosure and has the same mounting hole pattern and connectors. Identical NMEA sentences are available, and the GS version includes additional binary data output for temperature and diagnostics.

The Revolution GS comes with an enhanced version of True North's demonstration software that is backward compatible with all other Revolution models. The magnetic calibration procedure required upon installation is identical, as are cabling and power requirements.

For more information, pricing, and availability, please call True North Technologies or e-mail sales@tntc.com.

Features

- ◆ **Exceptional Dynamic Performance**
 - ⇒ Heading within 3° typical for rates < 250 °/sec
 - ⇒ Pitch and roll within 0.3° for rates < 250 °/sec
- ◆ **High Static Accuracy**
 - ⇒ Heading within 0.5° or better
 - ⇒ Tilt within 0.2° or better
- ◆ **Wide Operating Range**
 - ⇒ ±42° Pitch and Roll
 - ⇒ ±80° Dip angle range
 - ⇒ Temperature -40° to 105°C
 - ⇒ Local Hard Iron to ±1.5 Gauss
- ◆ **Precise Calibration**
 - ⇒ Gyros calibrated for offset and gain from -40 to 85C
 - ⇒ Rate sensors calibrated and aligned to magnetometer and tilt sensor
 - ⇒ Cross-axis error nearly eliminated on gyros and magnetometer
- ◆ **Single Supply Operation**
 - ⇒ 6 to 45V unregulated DC or
 - ⇒ 5V regulated DC
 - ⇒ Thermal overload and reverse polarity protection
- ◆ **Fast Response**
 - ⇒ 28 readings per second
 - ⇒ Wake from standby in 50 msec
- ◆ **Low Power**
 - ⇒ 30 mA operating
 - ⇒ 10 mA sample
 - ⇒ 2 mA standby
- ◆ **Wide Selection of ASCII or Binary Output data**
 - ⇒ Heading, pitch, and roll
 - ⇒ Magnetometer X, Y, and Z
 - ⇒ Temperature, input voltage, and dip angle
 - ⇒ Output ASCII or binary
 - ⇒ Horizontal X and Y magnetic field strength
 - ⇒ Raw and conditioned gyro data
- ◆ **Two independent serial channels**
 - ⇒ Full-duplex RS-232 for the external RJ12
 - ⇒ Either RS-232 or full-duplex RS-485 for the internal connector
- ◆ **In-System Configuration and Test**
 - ⇒ Laptop can be connected while unit operates in situ
 - ⇒ Perform hard and soft iron calibration
 - ⇒ Monitor outputs and change user-definable settings

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Specifications

Heading Performance

<u>Parameter</u>	<u>Value</u>	<u>Conditions</u>
Accuracy ¹	± 0.5° rms ± 3.0° rms	Static, Tilt < 35° Dip < 60° Dynamic, rate < 250°/sec
Repeatability	± 0.3°	Static, no filter
Response time	36 msec	Minimum, no filter
Dip Angle Range	± 80°	
Tilt Range	± 42°	
Update rate	28 per second	

¹ May require calibration after installation to eliminate effect of local magnetic field

Pitch and Roll Performance

Accuracy	± 0.3	Factory calibrated
Repeatability	± 0.2°	No filter
Range	± 42°	
Settling time	0.5 sec	Gyros enabled

Electrical

Supply Current	30 mA operating 10 mA sample 2 mA standby	typical typical typical
Supply Voltage (V _{DD})	6 – 45 Vdc unregulated 5.0 Vdc regulated	4.9 Vdc min

Environmental

Operating Temp	-40 to 105°C	
Storage Temperature	-50 to 150°C	
Humidity	0 to 90%	Non-condensing

Mechanical

Box	Hammond Mfg1591MFL
PCB Size	1.8"W x 3.0"L x 0.6"H
PCB Mounting	4 #4 screws, 1.4" x 2.2" spacing
Weight	4 oz. in box
Connectors	8 pin, single-row, 0.1" friction header 6 pin RJ12 modular jack

Interface

Signal type	RS-232 and RS-485
Baud rate	2400, 4800, 9600, 19200, 38400, or 57600 bps
Character Format	8 data, no parity, 1 stop
Input Buffer Size	110 characters
Output Buffer Size	110 characters
Output Format	NMEA 0183 and binary
Output Data Rate	1 to 1650 sentences per minute
Operating Modes	Continuous or sample
Angle Units	Degrees, mils, radians, 16-bit integer