



True North Technologies *Revolution™ Upgrade* Electronic Compass

General Description

The Revolution Upgrade (TNT1500) combines a precision 3-axis solid-state magnetometer and a rugged 2-axis electrolytic tilt sensor to provide accurate heading and tilt measurements over a wide range of environmental conditions. The firmware and signal processing algorithms have been refined and improved over three prior generations of compasses to deliver the ultimate in performance from the available sensor data.

The TNT1500 is recommended for applications that include surveying, antenna positioning, dead reckoning, and as supplemental navigation when GPS is not available.

Why a Revolution?

A key advantage of the Revolution is its quick-connect, external serial interface. While the compass is in-place, and without disconnecting system wiring, a serial cable or available USB cable can be temporarily connected via the RJ12-style modular receptacle. This allows easy access during installation for calibration and tuning. It also provides a valuable diagnostic port and can be used for an auxiliary read-out when needed. In situations where a fixed installation is not desirable, the RJ12 connection can be used exclusively.

Among the host of user definable parameters is the selection of NMEA output data and update rate; operating mode as continuous or query-only; and angle data in degrees, mils, radians, or 16-bit integer (65536 counts per revolution). Compensation for both hard and soft iron influences is built-in.



Features

- ◆ **High Accuracy**
 - ⇒ Heading within 0.5° or better
 - ⇒ Tilt within 0.3° or better
- ◆ **Wide Operating Range**
 - ⇒ ±42° Pitch and Roll
 - ⇒ ±80° Dip angle range
 - ⇒ Temperature -40° to 105°C
- ◆ **Fast Response**
 - ⇒ 27.5 readings per second
 - ⇒ Wake from standby in 50 msec
- ◆ **Single Supply Operation**
 - ⇒ 6 to 45V unregulated DC
- ◆ **Low Power**
 - ⇒ 25 mA operating
 - ⇒ 10 mA sample
 - ⇒ 2 mA standby
- ◆ **Wide Selection of Output data**
 - ⇒ Heading, pitch, and roll
 - ⇒ Magnetometer X, Y, and Z
 - ⇒ Dip angle
 - ⇒ Total, horizontal, and vertical magnetic field strength
- ◆ **Choice of Interface**
 - ⇒ Full-duplex RS-232
 - ⇒ Full-duplex RS-485
- ◆ **In-System Configuration and Test**
 - ⇒ PC or laptop can be connected while unit operates in-situ
 - ⇒ Perform hard and soft iron calibration
 - ⇒ Monitor outputs and change user-definable settings

About True North

True North Technologies, a 25-year-old manufacturer, offers a development kit that includes the compass, cable, and software. All products are made in the USA.

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Specifications

Heading Performance

Parameter	Value	Comments
Accuracy	± 0.5° rms	Typical, Tilt < 35° Dip < 60°
Repeatability	± 0.3°	No filter
Response time	36 msec	Minimum, no filter
Dip Angle Range	± 80°	
Tilt Range	± 42°	
Update rate	27.5 per second	

Pitch and Roll Performance

Parameter	Value	Comments
Accuracy	± 0.3°	Factory calibrated
Repeatability	± 0.20°	No filter
Range	± 42°	
Settling time	0.5 sec	No damping

Electrical

Parameter	Value	Comments
Supply Current	25 mA operating 10 mA sample 2 mA standby	typical typical typical
Supply Voltage (V _{DD})	6 – 45 Vdc unregulated	

Environmental

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

Mechanical

Parameter	Value	Comments
Box	Hammond Mfg1591MFL	
PCB Size	1.8"W x 3.0"L x 0.6"H	H required for tilt sensor
PCB Mounting	4 #4 screws, 1.4" x 2.2" spacing	
Weight	3 oz. in box	
Connectors	8 pin, single-row, 0.1" friction header 6 pin RJ12 modular jack	

Interface

Parameter	Value
Signal type	RS232 or RS485
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