



# True North Technologies *Revolution™ 1501LP* Low Power Electronic Compass

## *General Description*

The Revolution™ LP is a strap-down electronic compass designed specifically for commercial, industrial, and military users. The LP will be of particular interest to ROV and AUV manufacturers who are concerned with power usage and accurate heading in all types of challenging conditions. In standby mode, it draws a mere 50  $\mu$ A and requires only 15 mA in run mode. It provides accurate heading data in less than a tenth of a second from wakeup. An extended range tilt sensor is available that allows for  $\pm 60^\circ$  of pitch and roll.

Recommended applications are unmanned vehicles, robotics, weather buoys, antenna positioning, and marine navigation.

### High Accuracy

- ⇒ Heading within  $0.5^\circ$  or better
- ⇒ Tilt within  $0.3^\circ$  or better

### ◆ Wide Operating Range

- ⇒  $\pm 60^\circ$  Pitch and Roll\*
- ⇒  $\pm 80^\circ$  Dip angle range
- ⇒ Temperature  $-20^\circ$  to  $70^\circ$ C
- ⇒ Local Hard Iron to  $\pm 1$  Gauss

### ◆ Fast Response

- ⇒ 14 readings per second
- ⇒ Wake from standby in 75 msec

### ◆ Single Supply Operation

- ⇒ 6 to 30V unregulated DC or
- ⇒ 5V regulated DC

### ◆ Low Power

- ⇒ 15 mA in run mode
- ⇒ 5 mA in sample mode
- ⇒ 50  $\mu$ A in standby mode

### ◆ Wide Selection of Output data

- ⇒ Heading, pitch, and roll
- ⇒ Magnetometer X, Y, and Z
- ⇒ Dip angle
- ⇒ Total, horizontal, and vertical magnetic field strength

### ◆ Interface

- ⇒ Full-duplex RS-232 or TTL

### ◆ In-System Configuration and Test

- ⇒ PC or laptop can be connected while unit operates in-situ
- ⇒ Perform hard and soft iron calibration

\*with optional tilt sensor

## *Why a Revolution LP?*

Many aspects of the LP remain unchanged from the original Revolution including 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 jack. 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.

## *About True North*

True North Technologies, a 20-year-old manufacturer, offers a development kit that includes the compass, cable, and software. The Revolution is covered by a full one-year replacement warranty. 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	± 0.2°	No filter
Response time	75 msec	Minimum, no filter
Dip Angle Range	± 80°	
Tilt Range	± 42°	±60° available
Update rate	14 per second	

### Pitch and Roll Performance

Parameter	Value	Comments
Accuracy	± 0.2°	Factory calibrated
Repeatability	± 0.15°	No filter
Range	± 42°	±60° available
Settling time	0.5 sec	No damping

### Electrical

Parameter	Value	Comments
Supply Current	15 mA operating 5 mA sample 50 µA standby	typical typical typical
Supply Voltage (V <sub>DD</sub> )	6 – 30 Vdc unregulated 5.0 Vdc regulated	4.9 Vdc min

### Environmental

Parameter	Value	Comments
Operating Temp	-20 to 70 °C	
Storage Temperature	-40 to 125 °C	
Humidity	0 to 90%	Non-condensing

### Mechanical

Parameter	Value	Comments
Box	Hammond Mfg1591M(L)FL	
PCB Size	1.6"W x 3.0"L x 0.6"(.08")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 TTL
Baud rate	2400, 4800, 9600, or 19200 bps
Character Format	8 data, no parity, 1 stop
Input Buffer Size	90 characters
Output Buffer Size	110 characters
Output Format	NMEA 0183
Output Data Rate	1 to 1200 sentences per minute
Operating Modes	Continuous or sample
Angle Units	Degrees, mils, radians, 16-bit integer