True North Technologies
2 Clock Tower Place, # 335
Maynard, MA 01754 USA
Ph: 978-897-5400 • Fax: 978-897-1144
Website: www.tntc.com

*Revolution*tm

## Strapdown Electronic Compass

General Description

Based on True North's field-proven technology, this evolutionary device represents the state-of-the-art in magnetic compassing. It 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.

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 companion PDA 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 operating 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, and the companion PDA can be used to perform specific calibration procedures.

True North offers a development kit that includes the compass and companion PDA. Both devices are covered by a full one-year replacement warranty.
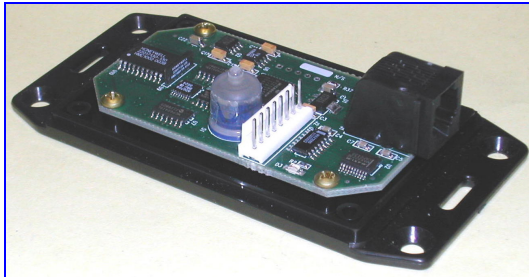
Features

♦ **High Accuracy**
⇒ Heading within 0.5° or better
⇒ Tilt within 0.2° or better

♦ **Wide Operating Range**
⇒ ±40° Pitch and Roll
⇒ ±80° Dip angle range
⇒ Temperature 0° to 150°F
⇒ Local Hard Iron to ±1 Gauss

♦ **Fast Response**
⇒ Up to 20 readings per second
⇒ Wake from standby in 75 msec

♦ **Single Supply Operation**
⇒ 5 to 25V unregulated DC or
⇒ 5 V regulated DC

♦ **Low Power**
⇒ 15 mA operating
⇒ 5 mA sample, 1 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
⇒ Horizontal X and Y magnetic field strength

♦ **Choice of Interface**
⇒ Full-duplex RS-232
⇒ Full-duplex RS-485

♦ **In-System Configuration and Test**
⇒ Palm PDA can be connected while unit operates in situ
⇒ Perform hard and soft iron calibration
⇒ Monitor outputs and change user-definable settings

Specifications

Heading Performance

Parameter	Value	Comments
Accuracy	$\pm$ 0.5° rms	Typical, Tilt < 35° Dip < 60°
Repeatability	$\pm$ 0.2°	No filter
Response time	75 msec	Minimum, no filter
Dip Angle Range	$\pm$ 80°	
Tilt Range	$\pm$ 40°	
Update rate	20 per second	

Pitch and Roll Performance

Parameter	Value	Comments
Accuracy	$\pm$ 0.2°	Factory calibrated
Repeatability	$\pm$ 0.15°	No filter
Range	$\pm$ 42°	
Settling time	0.5 sec	No damping

Electrical

Parameter	Value	Comments
Supply Voltage (V_{DD})	5.0 Vdc regulated	4.9 Vdc min
	5 - 25Vdc unregulated	
Supply Current	15 mA operating	typical
	1 mA standby	typical

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 Mfg1591MFL	
PCB Size	1.6"W x 3.0"L x 0.6"H	H required for tilt sensor
PCB Mounting	4 #4 screws, 1.4" x 2.6" spacing	
Connectors	8 pin, single-row, 0.1" friction header	
	6 pin RJ12 modular jack	
Weight	3 oz. in box	

Interface

Parameter	Value
Signal type	RS232 or RS485
Baud rate	1200, 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, integer