Preliminary Specification

TCM 6

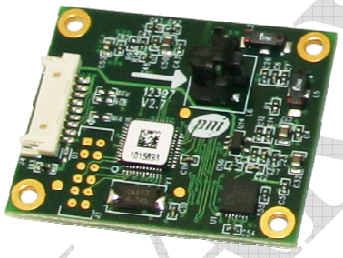
Tilt-Compensated Digital Compass with Selectable Calibration Modes

General Description

PNI's TCM6 tilt-compensated digital compass provides unparalleled 3-axis orientation performance for a variety of calibration conditions. The TCM6 combines PNI's patented magneto-inductive sensors, a 3-axis accelerometer, and PNI algorithms in a temperature and noise-stabilized design that's inherently free of offset drift.

Using PNI's proprietary hard and soft iron calibration algorithms, magnetic anomalies encountered in the field can be accounted for, resulting in reliable and consistent heading readings. The TCM6 has four user-selectable calibration modes:

- ***Full-Sphere Cal***: for applications where the compass can be tilted through a full 360° range during the field calibration process: Provides the highest accuracy over the greatest range.
- ***Hard Iron-only Cal***: corrects for changes in hard iron distortion. Re-establishes Full-Sphere Cal performance with as few as 4 calibration points over ±45°.
- ***2D Cal***: for applications where tilting the compass during calibration is not possible. Accuracy is <2º rms at <5° of tilt.
- ***Limited-Tilt Calibration***: for applications where the compass can be tilted over a limited range. Accuracy is <2º rms over twice the calibration tilt range. For example, if the calibration is done with tilt restricted to 10º, then the accuracy would be <2º when the tilt is ≤20º.



Features

- Heading accuracy of <0.3° with full-sphere calibration
- Full sphere (360°) measurement capability
- Hard and soft iron correction with quality of calibration score
- 4 different selectable calibration methods
- Advanced calibration scoring
- Low power consumption
- Binary RS232 interface
- RoHS compliant

Applications

- Physically constrained applications limiting the tilt angles used for calibration
- High-performance navigation equipment
- High-performance attitude measurement
- Dead-reckoning navigation systems
- Surveying equipment
- Robotics systems
- 3-axis magnetic field sensing
- Laser range finders

Parameter				Value
Performance Specifications				
Heading	Range			360°
	Accuracy	Full-sphere cal. with ≤70° of tilt		<0.3° rms
		Full-sphere cal. with ≤85° of tilt		<0.5° rms
		2D calibration with ≤5° of tilt		<2.0° rms
		Limited-tilt calibration with tilt ≤2x the tilt calibration angle		<2.0° rms
	Resolution			<0.1°
	Repeatability			0.05° rms
Tilt (Pitch & Roll)	Range	Pitch		± 90°
		Roll		± 180°
	Accuracy	Pitch		0.2° rms
		Roll	≤65° of pitch	0.2° rms
			≤80° of pitch	0.5° rms
			≤86° of pitch	1.0° rms
	Resolution			<0.01°
	Repeatability			0.05°
Maximum Dip Angle				85°
Magnetometers		Calibrated Field Range		± 125 µT
		Resolution		0.05 µT
		Repeatability		0.1 µT
I/O Characteristics				
Latency from Power On				<50 ms
Latency from Sleep Mode				<1 ms
Maximum Sample Rate				>20 samples/sec
RS-232 Communication Rate				300 to 115,200 baud
Output Format				Binary Protocol
Mechanical Characteristics				
Dimensions (*l* x *w* x *h*)				3.5 x 4.3 x 1.3 cm
Weight				7 gm
Mounting Options				Screw mount / standoff, horizontal or vertical
Connector for RS-232				9-pin, mates with Molex pn 51146-0900
Power Requirements				
DC Supply Voltage				3.6 - 5 V (unregulated)
Current Draw (under continuous operation)		Maximum		22 mA
		Typical		<20 mA
Sleep Mode				0.6 mA
Environmental Requirements				
Operating Temperature				-40C to +85C
Storage Temperature				-40C to +85C

Product specifications are preliminary and subject to change.