
TCM 6

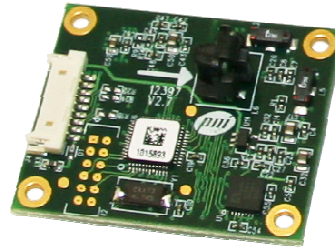
Tilt-Compensated Digital Compass with Selectable Calibration Modes

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 Range Calibration:** provides the highest accuracy over the greatest range. For applications where the compass can be tilted through $\pm 45^\circ$ during the field calibration process:
- **2D Calibration:** for applications where tilting the compass $>5^\circ$ during calibration is not possible. Accuracy is $<2^\circ$ rms.
- **Limited Tilt Range Calibration:** for applications where the compass can be tilted $>5^\circ$, but not a full $\pm 45^\circ$. Accuracy is $<2^\circ$ rms over twice the calibration tilt range. For example, if the calibration is done with tilt restricted to 10° , then the accuracy would be $<2^\circ$ when the tilt is $\leq 20^\circ$.
- **Hard Iron-only Calibration:** corrects for changes in hard iron distortion. Re-establishes calibrated performance with as few as 4 calibration points.



Features

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

Applications

- Physically constrained applications limiting the tilt angles used for calibration
- 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	≤65° of tilt after full range cal.	<0.3° rms	
		≤80° of tilt after full range cal.	<0.5° rms	
		≤5° of tilt after 2D calibration	<2.0° rms	
		≤2 times the calibration tilt angle when using limited-tilt calibration	<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	0.4° rms
			≤86° of pitch	1.0° rms
	Resolution		0.01°	
Repeatability		0.05° rms		
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		<210 ms		
Latency from Sleep Mode		<50 ms		
Maximum Sample Rate		≈30 samples/sec		
RS-232 Communication Rate		300 to 115,200 baud		
Output Interface		RS232, Binary Protocol		
Mechanical Characteristics				
Dimensions (<i>l x w x h</i>)		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)		
Average Current Draw	@ maximum sample rate	20 mA		
	@ 8 Hz sample rate	16 mA		
Sleep Mode		0.3 mA		
Environmental Requirements				
Operating Temperature		-20C to +70C		
Storage Temperature		-40C to +85C		

Product specifications are preliminary and subject to change.